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Original Articles

Further Observations on Intraocular Acrylic Lenses in Cataract Surgery

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IT is now possible to offer more extensive and up-to-date information and statistics on intraocular acrylic lenses than it was when my initial reports were published, though inevitably, with no concise a subject, some ground will be covered which will be familiar to many who have read earlier papers.

From time to time the possibility of employing artificial lenticuli had occurred to many ophthalmologists, only to be put aside as an impossibility.

In the fall of 1949, however, I performed an intracapsular extraction at St. Thomas's Hospital, London. It was witnessed as usual by undergraduate students, one of whom inquired, when I had finished, why I did not replace the diseased lens by a new one within the eye! To this unknown student must be given the credit of stimulating my researches.

The disadvantages inherent in an aphakic eye corrected by an unsightly and heavy spectacle lens are well known. The image is unnaturally magnified by about one-third; the lens gives good acuity only through its optical center, oblique views causing distortion and apparent displacement of such objects as steps; the useful visual field is limited, and there is no accommodation. All of these disadvantages except the last, which is usually normally reduced in patients with cataract, are avoided by the use of an intraocular lens. Furthermore, if the other eye still retains useful sight binocular vision can be restored, the two eyes being part-

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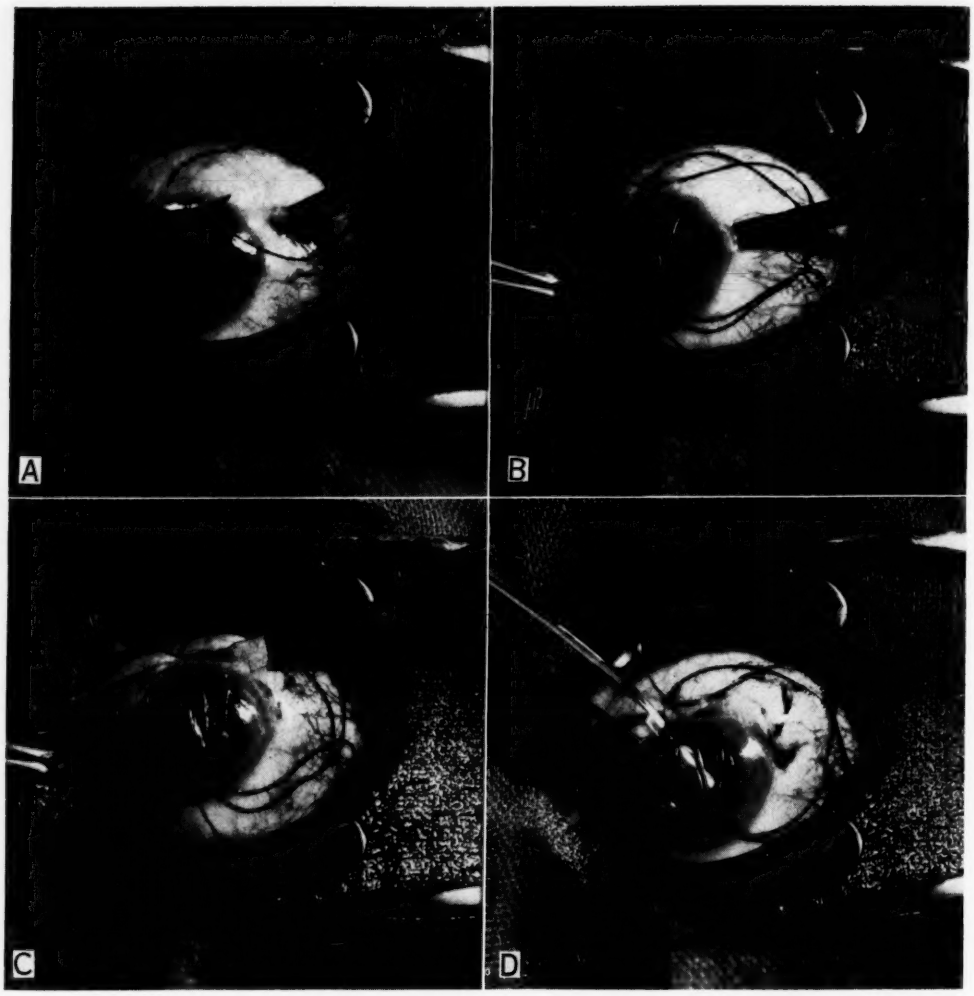

Fig. 1.—*A*, insertion of two half-depth mattress sutures. *B*, cataract section with Graefe knife. *C*, inclusion of small conjunctival flap (see text). *D*, removal with capsule forceps.

ners again instead of rivals. This is a very great advantage. All ophthalmologists have known patients with cataract who persist in using a cataractous eye, seeing only 6/24 (20/80) in preference to an aphakic eye correctable to 6/6 (20/20). Contact lenses are seldom really successful in aphakic patients, being difficult for a patient with cataract to insert and tolerate; moreover, even they magnify the retinal image by about one sixth.

The problems to be solved were three: to select a transparent material that would be tolerated within the eye; to determine the size, shape and refractive power of the artificial lens, and to devise a method of inserting it and retaining it in position. Preliminary animal experiments were con-

sidered but were rejected as likely to have but limited value except as a test of the tolerance of materials, of which enough information was already available, mainly as a result of war injuries. Animal physiology differs from human; subjective tests are impossible, and the lens specification could not be determined by this means.

The choice of material lay between glass and methacrylate, both of which are plentiful, consistent in composition and easily and accurately worked. Both are well tolerated and set up negligible tissue reaction in the body. Even in the eye these substances cause no inflammation unless in contact with a sensitive and mobile portion such as the iris, and, indeed, there were many instances in which the presence of transparent foreign bodies had been overlooked by competent ophthalmic surgeons. The overwhelming advantage of methacrylate is its light weight—it weighs only about half as much as glass. The Imperial Chemical Industries were consulted with regard to suitable material and advised the use of their product Transpex I. This is a fully polymerized variety of polymethyl methacrylate in which there is no free monomer that might be gradually liberated and set up a tissue reaction. Impure forms of methacrylate, especially those which give off a faint odor, are dangerous, whereas the pure compound has never been known to cause irritation. The specific gravity of Transpex I is 1.19 and its refractive index 1.49. In passing it may be mentioned that human lens grafts were considered; they would not appear to be completely impracticable, though they have few if any advantages, over synthetic compounds, which are not subject to degenerative changes.

The design of the artificial lenticulus was no simple problem. The natural lens is a complex structure, the composition of which varies as between capsules, cortex and nucleus. Moreover, its dimensions are variable, especially when removed from the eye or when microscopic sections are made. Its refractive index is estimated at 1.42, but its total power has been variably estimated between plus 16.01 (Tscherning) and plus 19.11 (Gullstrand). It might be thought from these widely differing figures that considerable individual variation occurs, but our researches seem to indicate the opposite and that most human lenses are similar in power. The standard artificial substitute usually renders the refraction within about 2 dioptres of that of the other eye, the disparity being insufficient to produce troublesome anisometropia. The diameter selected for the acrylic lens was 8.35 mm., about 1 mm. less than the natural, for ease of insertion and to avoid pressure on the ciliary body. Since the artificial lens might not lie in precisely the normal situation, no means could be devised for determining its curvatures except by trial on human beings. Our prototypes too closely copied the natural lens curves and proved far too strong. The first 2 patients, who fully understood the experimental nature of the operation, deserve my thanks for their valuable assistance, for they proved that a lens could be inserted and tolerated, and the effect was good enough to allow computation of the overcorrection so that a satisfactory design was found for subsequent cases. The specifications of the lenses used for all but the first patients is as follows:

Material	Transpex I
Diameter	8.35 mm.
Thickness	2.4 mm.
Anterior curve diameter	17.8 mm.
Posterior curve diameter	10.7 mm.
Refractive power in aqueous (refractive index 1.33), 24 dioptres	

A peripheral groove is cut in both surfaces before final polishing, to permit the lens to be grasped with forceps.

To retain the lens in position, the consideration was given to the possibilities of sutures and similar devices, but it was hoped that the lens, which is only about 15 per cent heavier than the aqueous fluid it displaces, would be supported upright between the posterior lens capsule and vitreous body behind and the muscular iris with intact sphincter muscle in front. Fortunately this hope has been justified; when a perfect extracapsular operation has been performed no lens has become

dislocated. In fact, it is surprising, once the eye is soundly healed, how little the refraction changes. A slight movement of a powerful lens would be of great refractive moment.

The operative technic normally employed is as follows: The patient is given 1 gr. of Phenobarbitone as a sedative, and the general preoperative routine, including conjunctival culture, is observed. The usual cataract instruments are prepared, with the addition of a pair of lens-introducing forceps and a special iris hook. The lenses (for there should always be a "spare" in case of accidental slipping) are placed in a special metal rack and sterilized for one hour in 1 per cent cetrimide, after which they are thoroughly washed in distilled water. Temperatures over 70 C. must be avoided, for they cause distortion of the acrylic material. The lenses are set in the rack correctly oriented so that the flatter front surface is known to the surgeon before the operation begins.

The pupil should be dilated to at least 5 mm. in diameter with homatropine only; full dilatation is by no means essential or desirable, for the curved edge of the acrylic lens will widen the iris aperture. Procaine (4 per cent) is injected over the neck of the mandible to block the upper branches of the facial nerve which supply the orbicularis muscle, and a simple lid stitch is inserted to ensure closure of the eye after operation. Anesthesia is provided by 4 per cent cocaine drops only, no retrobulbar injection being required.

Two half-depth corneoscleral mattress sutures are inserted (Fig. 1*A*) and an otherwise normal cataract section is cut with a Graefe knife (Fig. 1*B*) including, where possible, a small conjunctival flap as in Figure 1*C*. (I do not in ordinary extractions find any sutures desirable.) The anterior capsule is incised as far down as possible with a cystitome, and careful and complete removal is effected with toothed capsule forceps (Fig. 1*D*). After expression of the lens nucleus (Fig. 2), all cortical remnants are removed by thorough irrigation with physiologic solution of sodium chloride. It is sometimes necessary to insert smooth capsule forceps again to remove loose remnants. If it is decided that the posterior capsule has been completely cleared, the acrylic lens may be inserted forthwith; if not, it is advisable to close the eye, leaving it with an ordinary extracapsular extraction. In point of fact, I have never so far had to do this, though complete removal of cortical and capsular remnants has sometimes called for considerable perseverance and prolonged irrigation. In several cases, however, I have reopened an eye in which a traumatic cataract has absorbed or on which another surgeon has performed a perfect extracapsular extraction and inserted an acrylic lens at a second stage some months after the extraction. Assuming that the posterior capsule has been cleared, the acrylic lens is grasped by its peripheral groove with the special forceps and removed from the lens holder with its anterior surface upward. The corneoscleral section is opened by an iris repositor held in the surgeon's other hand, and the acrylic lens is guided into the eye downward and backward with a slight side-to-side movement so that it enters the pupil and lies partly beneath the lower portion of the iris (Fig. 3*A*). The forceps can then, and only then, be relaxed, and the lens is steadied by the repositor while the sides and upper portion of the iris are manipulated over it with the point of a hook or cystitome (Fig. 3*B*). Final centering is effected by external pressure on the cornea and sclera by iris repositors (Fig. 3*C*). A small peripheral iridectomy should be made (Fig. 3*D*), and after a final irrigation of the anterior chamber (Fig. 3*E*) the corneoscleral sutures are tied (Fig. 3*F*). Penicillin is instilled; it is not considered generally necessary or advisable to use miotics, and both eyes are padded for forty-eight hours.

The patient is allowed out of bed on the third or fourth day, and the sutures are removed on the eighth day. Even pressure by the muscular iris, almost comparable to gravity, keeps the light lens securely upright in the patellar fossa.

Some degree of mild plastic iritis is to

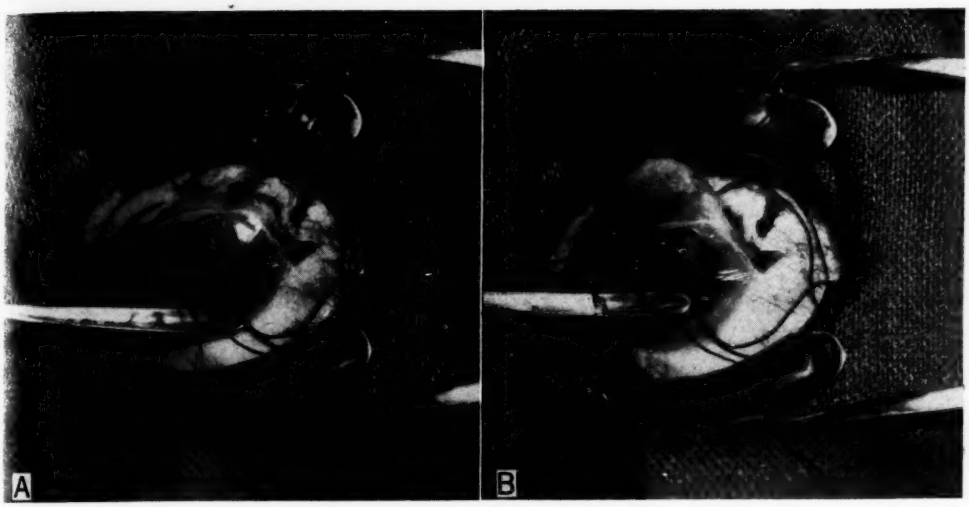

Fig. 2.—*A* and *B*, steps in expression of the lens nucleus.

be expected for a few weeks after the operation. The exudate, colored by iris pigment granules, adheres to the lens surface (though not to the cornea) but eventually clears, apparently in all cases. Clearing can be appreciably hastened by local administration of Cortisone. In some cases weak mydriatics are used, but care must be taken not to dilate the pupil fully for fear of dislocation of the lens into the anterior chamber.

It is quite essential that the cataract extraction should be perfectly performed and the pupil left central and circular if an acrylic lens is to be inserted. The patient should not be younger than 12 years of age, by which time the eye is practically fully grown, and not older than 75, though some good results have been obtained in persons over 80. Myopes are generally unsuitable; the risk is rather greater, and a cataract glass weaker than usual would normally be required.

In some 10 cases intracapsular extraction has been performed. Usually this has been accidental; capsule forceps employed after extraction and irrigation to remove tags of anterior capsule have carried away the posterior capsule as well. In other cases a deliberate intracapsular extraction has been planned, with considerable trepidation, because the cataract was of an immature posterior cortical or nuclear type and the patient had demanded an acrylic lens. In this operation the acrylic lens must be slid over the vitreous face. I fear this procedure, for it is clearly both difficult and dangerous, and can recommend it only to surgeons more proficient than myself. It is important in an intracapsular extraction that the pupil should not be fully dilated; if so, the lens cannot be retained beneath the lower part of the iris while the upper is manipulated, for the vitreous dome tends to push it forward.

The results of the first 63 cases seem to me to be most encouraging, and I cannot help wondering when our good luck will change. The first 27 cases have already been reported. The first 2 form a series of their own, because the lens employed was too large and too powerful. The eyes in the cases reported in February last saw in the preceding December. The levels of vision in these cases were as follows: 2, 6/36 (20/120); 1, 6/24 (20/80); 3, 6/18 (20/60); 2, 6/12 (20/40); 5, 6/6 (20/20), and 2, 6/5 (20/15). With 2 ex-

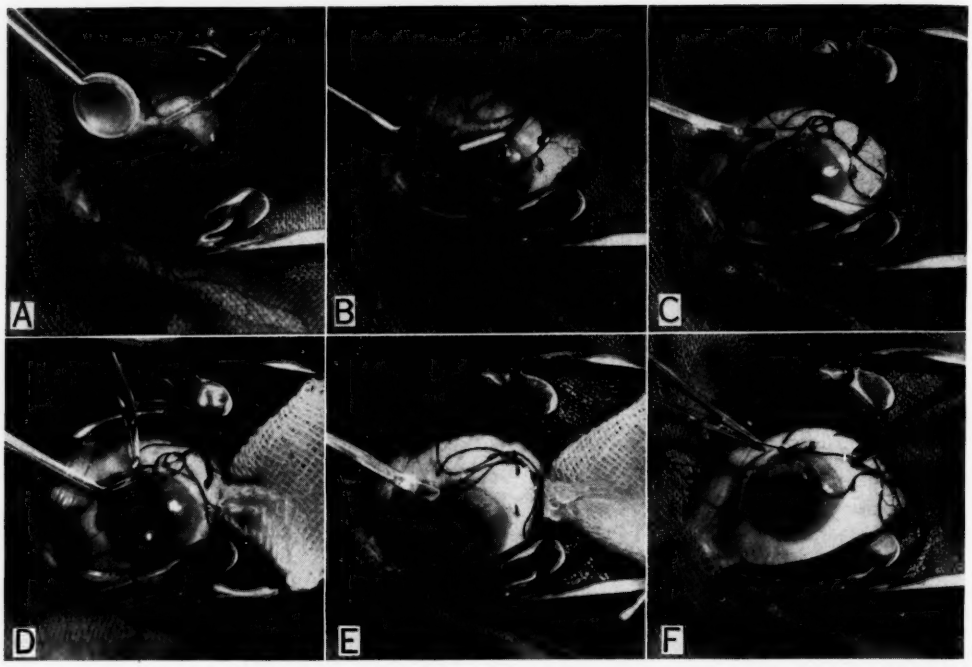

Fig. 3.—Insertion of acrylic lens. *A*, corneoscleral section opened by iris repositor; lens guided into eye as described in text. *B*, lens steadied by repositor while sides and upper portion of iris are manipulated over it. *C*, centering of lens by external pressure (see text). *D*, peripheral iridectomy. *E*, final irrigation of anterior chamber. *F*, corneal sutures tied.

ceptions, these eyes nine months later have as good vision as before, or better. In 4 cases the fixion is 6/18 (20/60); in 4, 6/12 (20/40); in 3, 6/9 (20/30); in 6, 6/6 (20/20), and in 3, 6/5 (20/15).

The exceptions in 1 case of unsuspected monocular myopia, in which the lens slipped after an intracapsular operation, and the case of a boy who returned to hospital with a black eye after a fight, with the acrylic lens partly in front of the iris. Both eyes, however, are quiet.

Thirty-six patients have undergone the operation at St. Thomas's Hospital and Moorfields Eye Hospital since the beginning of this year. In 2 cases both eyes contain acrylic lenses, but the last 14 cases (since June 30 of this year) are too recent to record. Of the remaining 22, 1 has vision of 6/18 (20/60); 3, 6/12 (20/40); 9, 6/9 (20/30); 5, 6/6 (20/20), and 2, 6/5 (20/15). Several may be expected to improve later, as did those in the earlier series. It is fair to say, therefore, that at present more than 50 per cent of our patients have vision of 6/9 (20/30) or better, more than half of these have vision of 6/6 (20/20) or better; 2 eyes have unaided vision of 6/5 (20/15). These levels of visual acuity, moreover, are obtained without the unnatural magnification provided by ordinary cataract glasses. The patients have, of course, few of the disadvantages of aphakia, and their two eyes are partners, providing binocular vision.

It always seems that one learns or should learn more from cases in which one has misadventures, difficulties and failures than from cases which proceed uneventfully to a happy and successful conclusion. I propose, therefore, to discuss

all the complications I have met, in the hope that others may benefit from and avoid my mistakes.

The first 2 cases in which the acrylic lens was too large and too powerful have already been reported, forming a preliminary series of their own, and in the next 2 the patients had lenses of the correct refractive power but of too great thickness. Among the extracapsular cases two lenses have subluxated, part of the prosthesis becoming anterior to the iris for the good reason that the preliminary extraction, in both instances preceding insertion of the lens by several months, was imperfect. In one of these a portion of the iris root was left adherent to the Graefe section so that about one-fifth of the lens circumference is visible. In the other a hole in the iris caused by an intraocular foreign body was found to be adherent to the underlying capsule when the acrylic lens was inserted. Had this been foreseen, an attempt would have been made to divide this synechia some days before. As it happened, the lens was inserted but was held up by this adhesion, making the pupil vertically oval; but the acuity was 6/9 (20/30). Six months later the patient, a boy aged 12 years, was involved in a fight and returned with a black eye and a partially dislocated lens which proved impossible permanently to replace. The eye, however, is fairly quiet and the acuity now 6/36 (20/120), a great improvement on a unilateral aphakic eye.

In 1 case, that of a rather feeble man 76 years old, the section failed to heal in the normal time and gaped on removal of the corneoscleral sutures. This led to slight iris inclusion, the formation of a false filtration angle and glaucoma. One very difficult patient, a woman aged 84, ruptured the section on the fourteenth day and the presenting lens was grasped and removed with forceps. In 2 cases there developed a moderate rise of tension associated with shallowness of the anterior chamber and a narrow filtration angle, but both readily responded to miotics.

In 1 early case it was necessary to divide the posterior capsule from behind. One iris prolapse required reposition.

Present Results of 6/9 (20/30) or Better

	Series 2 (1951) Total 25 cases		Series 3 (1952) Total 22 cases
6/9	3	(5)	9
6/6	6	(5)	3
6/5	3	(2)	2
	12		14

Summary of 47 cases:
6/9 (20/30) or better.....26 eyes
6/6 (20/20) or better.....14 eyes

Apart from an invariable but temporary deposition of fibrin and iris pigment on the anterior lens surface, which sometimes prevents good vision for a considerable time, the extracapsular extractions have given no other trouble.

Among the smaller number of intracapsular extractions there have been 2 total dislocations of lens into the bottom of the vitreous chamber. In both instances the eyes were highly myopic, and, as they remained quiet, the patients were rather pleased with the unexpected development. In 1 of these cases the vitreous face may still be seen flat and unbroken behind the pupil; the other has a little vitreous in the anterior chamber.

In 3 other cases, in 2 of which there were traumatic cataracts, I have felt unable to insert an acrylic lens because my extraction was imperfect. For these failures, however, the acrylic lens cannot be blamed since, its insertion was not attempted.

One other unfortunate case is instructive. Hypermaturity and a tough capsule caused an inadvertent but perfect intracapsular extraction. The pupil was dilated so fully that I could not retain the lens beneath the narrow iris, owing to pressure from the vitreous dome. I know now that I should have waited for contraction of the pupil by miotics before inserting the lens. The patient was deeply disappointed at being left with a plain extraction, the eye's vision is 6/5 (20/15). Too large a pupil is a disadvantage.

This list of difficulties and complications

may at first sight seem alarming, but I must affirm that it is complete. Nearly 90 per cent of the cases proceeded uneventfully, a proportion which, in my opinion, is indeed fortunate in view of the novelty and difficulty of the technic. Let us now consider the brighter side.

Sympathetic ophthalmia or prolonged iridocyclitis have not been encountered.

Serious glaucoma, except in 1 total failure, has not occurred.

Capsulotomy has been required in only 1 case. The pressure of the lens stretches the extremely thin posterior capsule, a simple membrane only 4 microns thick centrally, and prevents wrinkles, which are the usual cause of capsule trouble in otherwise perfect extracapsular aphakia.

Fibrin and pigment deposited on the lens initially always clear in weeks or months, and absorption is accelerated by cortisone.

The refraction is usually within 2 dioptres of that of the other eye, so that binocular vision is regained, perhaps with the aid of a low power lens.

The patients' reactions to this operation are interesting. None have complained of any abnormal sensation indicating the presence of a foreign body in the eye. No iris pain seems to be produced, and, strange to relate, no late iridocyclitic has occurred. Patients appreciate binocular vision from the start, even when the acuity of the treated eye is somewhat dimmed by exudate on the lens. Some seem to think that the sight of the other eye has been improved. The synoptophore has been employed in a number of cases to confirm the presence of single binocular vision. The only symptom worth reporting is that several complain of seeing red in bright sunlight or when snow is on the ground, probably because the artificial lens absorbs less long-wavelength light rays than does the natural. A strange feature is that the depth of focus seems greater than expected, though clearly no accommodation is possible. One eye had unaided vision of 6/5 (20/15) partly and 6/5 fully, with a minus 0.5 D sphere and also J6 at 2 feet.

My first paper on this subject was presented at the Oxford Ophthalmological Congress over a year ago, when our first artificial lenticulus had been in the eye only one and a half years. Had the handful of my colleagues who alone knew of our researches not encouraged me, I should have waited longer before publication. I said at that time that great caution was advisable, and I still think caution is desirable for many years to come. Nevertheless I must admit that my confidence has become much greater in the past year. Surgical technic has improved, and many excellent results have been obtained. The most encouraging feature, however, is the fact that the lens is well tolerated and that the eyes in the early cases are quieter than before. In many eyes which have contained acrylic lenses for more than one year the lens surface is as clear as when it came out of the sterilizing solution; in fact, it is quite difficult to see it with the slit lamp.

It now seems probable that an eye containing a satisfactory acrylic lens is actually stronger and safer than an ordinary aphakic eye. The lens acts as a bulkhead rendering prolapse of the iris unlikely and keeping the vitreous in place, thus lessening the possibility of retinal detachment and symptoms such as floating spots associated with vitreous shrinkage and detachment.

Time alone will show, but I am now hopeful that this operation will be widely employed to complete the cure of cataract, which is only half treated by extraction. One day, no doubt, science will find means to prevent rather than cure senile lens opacities.

SUMMARY

An account is given of events leading to the development of intraocular acrylic lenses and how various difficulties were overcome. Early and recent cases, numbering about 60, are reviewed, with an account of the results obtained. Observation extending for more than two and a half years indicates that the lens is well

tolerated and shows no evidence of giving rise to late complications. The outlook is now more favorable than when the first publication appeared one year ago.

Author's Note: My thanks are due to my friend Mr. J. Pike of Rayners for his help in designing and manufacturing the acrylic lenses and to the photographic department of St. Thomas's Hospital for the lantern slides. Colonel F. R. B. Skrimshire again determined the refraction and acuity of nearly every patient. Last but not least, I thank my early patients for their courage and the trust they put in me.

RÉSUMÉ

L'auteur rapporte les événements quil' ont amenérà se servir de l'acide acrylique intra-oculaire comme lentille et des difficultés surmontées. On rapporte 60 cas, répartis sur une période de plus de deux ans. On ne compte aucune complication facheuse. Les résultats sont maintenant plus heureux que ceux d'il y a un an.

RESUMEN

Se da una relación de los sucesos principales en el desarrollo de lentes acrílicos intraoculares y de la manera en que se presentan las dificultades. Se revisan 60 casos recientes, dando una relación de los resultados obtenidos. Observaciones de más de dos años y medio indican que los lentes son bien tolerados y no muestran incidencia de complicaciones tardías. La perspectiva es ahora más favorable que hace un año, cuando apareció la primera publicación.

RIASSUNTO

Relazione sui fatti che hanno condotto alla applicazione delle lenti acriliche intraoculari, e sulle difficoltà che si dovettero superare. Revisione di circa 60 casi, fra antichi e recenti con i relativi risultati. Osservazioni condotte per oltre 2 anni e mezzo dimostrano che la lente è ben tollerata e non dà luogo a complicazioni tardive. La situazione è ora molto più favorevole di quando comparve la prima pubblicazione or'è un anno.

ZUSAMMENFASSUNG

Die Ereignisse, die zur Entwicklung der intraokulaeren Acrylsaeurelinsen fuehrten, und die Ueberwindung der mannigfachen Schwierigkeiten werden geschildert. Ungefaehr 60 Faelle aelteren und juengeren Datums und die erzielten Resultate werden besprochen. Die Beobachtungen, die sich ueber mehr als zweieinhalb Jahre erstrecken, zeigen, dass die Linse gut vertragen wird und keine Anzeichen des Auftretens spaeterer Komplikationen abgibt. Die Aussichten sind heute guenstiger als sie vor ungefaehr einem Jahr zur Zeit der ersten Veroeffentlichung waren.

SUMÁRIO

E apresentado um resumo das pesquizas e resultados obtidos pelo autôr no sentido de substituir o cristalino cataratado por outro, artificial, de acrílio. Novos e recentes casos, em numero de 60, foram apreciados, especialmente quanto aos resultados obtidos. A sua observação se extende por dois amos e mêio, concluindo o autôr que o cristalino de acrilio é bem tolerado e não oferece qualquer indicio de complicações tardias. Os resultados são agora mais favoraveis ainda que a um ano atraz quando a primeira publicação sôbre o assunto vêio a lume.

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An Original Iconographic Technic for Arteriographic Films with Three-Dimensional Appearance

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IT IS well known that in the reproduction of original radiologic images or radiograms, either positive or negative, one often loses many special and important details, which at times are of the greatest diagnostic value.

In an exhaustive study I have undertaken on the appearance of arteriograms and aortographs made by myself in the Institute of Pathological Surgery of Rome, I have been struck by the observation that exact visualization of the smallest arteries was difficult even in the clearest radiograms, either on the negative or on the positive print.

I have endeavored, therefore, to evolve a technic based upon my studies, which I shall describe presently. The object is to give prominence even to the smallest arteries containing little contrast media, and to obtain a three-dimensional appearance.

I desire to state with emphasis that this method is not a technical discovery in itself, nor is it a new system of arteriographic investigation. In fact, the procedure is rather old; it seems to have been first used by G. D. Zanardo in 1894 and later by R. d'Aznaren in 1901, by Baruffi in 1905 and others working in the field of photography. Later this procedure was used to obtain various photographic effects, such as bas-relief, topographic clarity, etc. Thus, in order to gain my objective I have resorted to a technic which, though old, is unknown to most persons who work with photography.

By making use of this method in a new field (printing of arteriograms, aortograms, phlebographic studies and the like for a tridimensional visualization), I have found my procedure valuable in teaching and popularizing an easy and simple technic. This will be seen at once from prints accompanying this article.

The very simplicity of my technic, which may be used by anyone, commends itself for practical application. The simplicity of the procedure and its ease of performance renders it a valuable aid in diagnosis.

Technic of Three-Dimensional Arteriographic and Phlebographic Procedure.—It is well known that perception of the three-dimensional object is achieved by the eye through stereoscopic vision: two different images, taken from two different points, blend perfectly in both retinas. This lack of identity between the two images is the main reason for the "three-dimensional sense."

"Three-dimensional vision" of a flat image may be artificially obtained by taking simultaneously two photographs from two different positions about 7 cm. apart (i.e. the distance between the eyes). If one observes these two images through a stereoscope, a three-dimensional appearance is the result.

If one desires the three-dimensional appearance of a printed image he may resort to my procedure, as follows:

Step 1: Make a negative of a given radiographic image.

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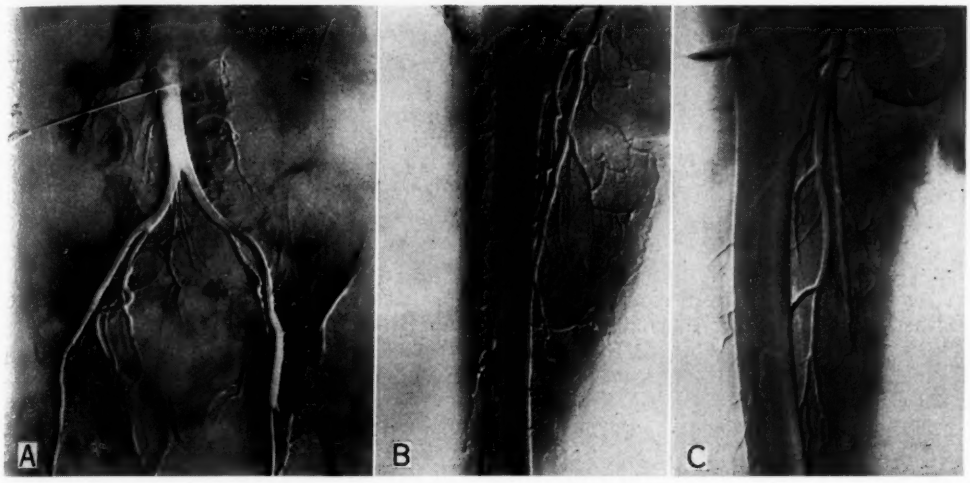

Fig. 1.—*A*, aortograph of a man aged 63. The small collateral branches have a three-dimensional appearance. The obturator arteries seem to emerge from the obturator foramen on the left. *B*, arteriograph of a male patient aged 52, with thrombo-angiitis obliterans of the femoral artery. *C*, arteriograph of a male patient aged 50, with thrombo-angiitis obliterans of the femoral artery.

Step 2: Make a positive from the negative film having about the same contrast qualities.

Step 3: Having thus obtained two images, negative and positive, place them exactly one upon the other, making sure that the image of the negative corresponds perfectly to the corresponding images of the positive.

Step 4: Now shift (slightly) the positive over the negative in the two axial directions (longitudinal and transverse).

Step 5: Make a print of both films thus superimposed.

The effects obtained by this technic are both impressive and convincing.

Slightly different effects can be obtained by shifting both films in various directions or by varying the intensity of the contrast of the negative or of the positive.

Sometimes the image looks like a bas-relief. Under such conditions it is sufficient to change the position by shifting the films to obtain the desired appearance.

The method described, the printing of arteriograms and phlebographic studies as outlined led me to the opinion that no other method extant offers the diagnostic values demonstrated. My method clarifies and accentuates in black and white all the lines in the radiographic image that would appear inconspicuous and pallid when viewed on the usual print; furthermore, by accentuating these lines one also obtains a very clear three-dimensional appearance of the image, which may be printed directly from the superimposed films.

This procedure may be used not only for arteriographic, aortographic and phlebographic visualization but may be resorted to with the same success for the printing of bronchographs, cholocystographs, urographs, aneiocardiographs, etc.

SUMMARY

The author has evolved a special technic for reproducing aortographic, arteriographic and phlebographic films and affecting a three-dimensional appearance of the blood vessels and other structures. This method may also be used for the reproduction of a variety of radiographic images. The author's technic is presented, supple-

mented by a series of prints depicting different conditions and the results obtained.

ZUSAMMENFASSUNG

Der Autor hat eine spezielle Technik zur Reproduction von aortographischen, arteriographischen und phlebographischen Filmen entwickelt und dabei ein dreidimensionales Bild der Blutgefaesse und anderer Strukturen erziel t. Diese Methode kann auch zur Reproduction verschiedenster radiographischer Bilder verwendet werden. Die Technik des Autors wird geschildert und ergaenzt durch eine Serie von Bildern, die die verschiedenen Zustaende zeigen und die erhaltenen Resultate.

RÉSUMÉ

L'auteur a développé une techniqu spécial pour reproduire les films aortographiques, arteriographiques et phlébographiques et produisant l'image des trois dimensions des vaisseaux et d'autres organes. Cette méthods peut aussi être employée pour la production de certaines images radiographiques. L'auteur décrit sa technique qu'il supplémente par une série d'imprimés illustrant différentes conditions et les resultats a obtenies.

SUMÁRIO

O autor descreve uma tecnica especial para reproduzir aortografias, arteriografias e filmes flebograficos com a qual

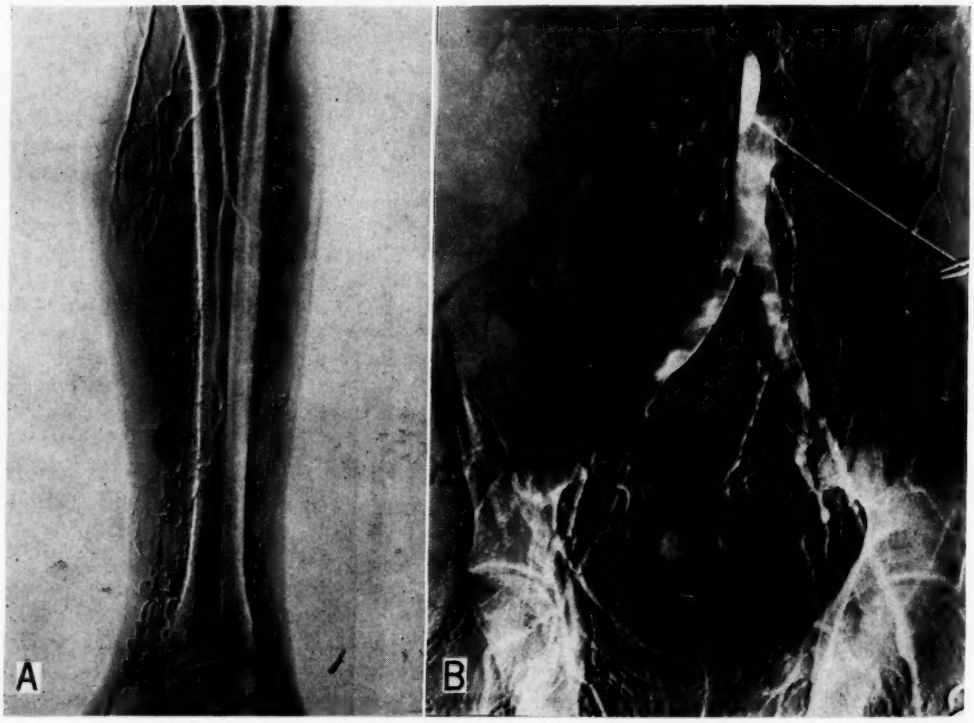

Fig. 2.—*A*, arteriograph of a male patient with thrombo-angiitis obliterans of the legs, showing good collateral circulation. *B*, aortograph of a male patient aged 45.

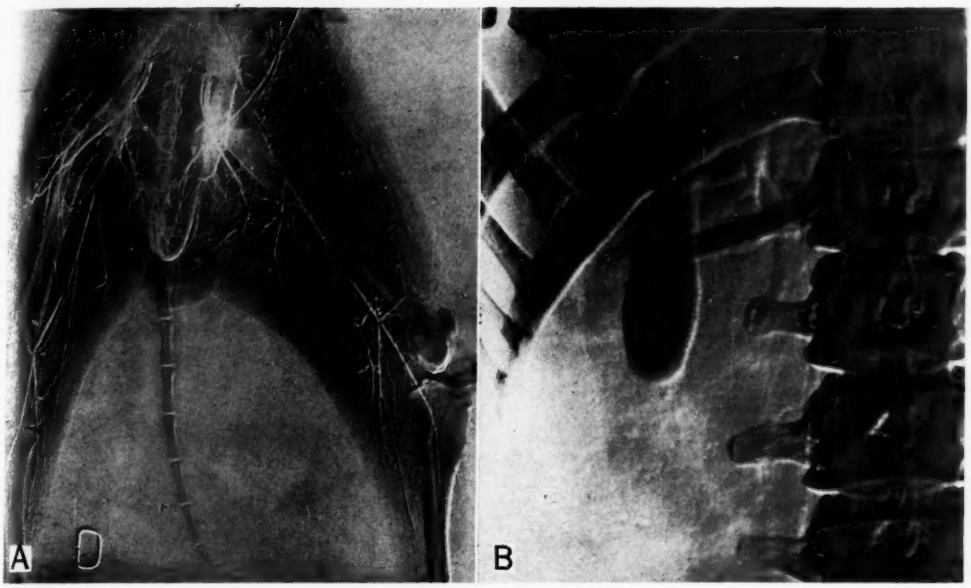

Fig. 3.—*A*, arteriograph of a dog (after experimental occlusion of both external iliac arteries). *B*, cholecystograph.

se conseque uma demonstração tri-dimensional dos vasos sanguineos e de outras estruturas. Este método pode tambem ser usado para reproduzir uma variedade de imagens radiograficas. A tecnica do autor é apresentada, suplementada por uma serie de clichês que diferenciam condições heterogeneas e os resultados obtidos são apresentados.

RIASSUNTO

L' autore ha sviluppato una speciale tecnica della riproduzione aortografica, arteriografica e flebografica dei films a scopo di mettere in evidenza le tre dimensioni dei vasi sanguini ed altre struttura. Questo metodo puó essere impriegato anche per la riproduzione di una varieta di imagini radiografici. Una serie di pubblicazioni descrive la tecnica dell autore, considerando vari condizioni e dei risultati ottenuti.

RESUMEN

El autor ha desarrollado una técnica especial para reproducción aortográfica, arteriografía y flebografía produciendo una imagen tridimensional de los vasos sanguíneos y otras estructuras. Este método puede ser usado también para la reproducción de una variedad de imagenes radiográficas. Se presenta la técnica del autor, suplementada por una serie de impresiones de diferentes padecimientos así como los resultados obtenidos.

Fatal Hemorrhage from Bile Duct

A. LEE McGREGOR, F.R.C.S., (Eng.), M.Ch. (Edin.), F.I.C.S.
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HEMATEMESIS and melena have always presented a surgical challenge, though never has the surgeon's approach to it been as aggressive as it has now become. The physician too is forsaking a traditional conservatism to secure the benefits of surgery for his patients. The cause and the diagnosis of massive gastrointestinal hemorrhage present grave difficulty, and if a wrong conclusion is arrived at and inappropriate treatment employed, disaster may well follow. Nor is the problem solved by blanket rules, e.g., "Failure to find the cause of the bleeding is an indication for partial gastrectomy." It is probably correct to say that in considering the possible causes of massive hemorrhage from the gastrointestinal tract the surgeon does not give the bile duct due consideration, and this applies to jaundice also.

Lichtman[1] in 1936 classified hemorrhage related to diseases of the liver and biliary system as follows:

A. Acholemic
   1. Origin in the portal circulation
      (a) Varices
      (b) Thrombosis of portal vein
   2. Origin in the liver
      (a) Trauma
      (b) Yellow atrophy
   3. Origin in the biliary tract
      (a) Vascular
         1. Ruptured aneurysm
         2. Erosion of blood vessel
         3. Perforation of gallbladder
      (b) Hemorrhagic cholecystitis
      (c) Neoplasm with ulceration

B. Cholemic dyscrasia

In 1950 Kerr, Mensh and Gould[2] subdivided hemorrhage of the biliary tract into those with intrahepatic and those with extrahepatic sources, as follows:

A. Intrahepatic
   1. Post-traumatic conditions
   2. Subacute yellow atrophy
   3. Hemangioma
   4. Central apoplexy
      (a) Aneurysm of hepatic artery

B. Extrahepatic
   1. Bile ducts
      (a) Calculus
      (b) Ulcer, benign, with erosion of hepatic artery, portal vein, etc.
      (c) Aneurysm
         1. Cystic artery
         2. Hepatic artery
      (d) Cavernomatous transformation of the portal vein
      (e) Carcinoma of the ampulla of Vater
   2. Gallbladder
      (a) Calculus—erosion of cystic artery, etc.
      (b) Ulcer
      (c) Hemorrhagic cholecystitis (hemocholecyst)
      (d) Carcinoma of gallbladder
      (e) Cholecystitis glandularis proliferans.

In a surgical experience of many years I have not encountered hemorrhage from the bile ducts, and have simply not considered this clinical entity of practical importance. In the surgical treatment of acute disease of the gallbladder there is often blood in the gallbladder and occasionally in the bile ducts, but to find macroscopic blood in the gallbladder or the ducts in the "cold" surgical treatment of these regions is so rare that it has not once been encountered in a series of several hundred cases.

Instances of fatal or near fatal hemorrhage from the bile ducts in nonjaundiced patients number fewer than 100 since the condition was first reported by Naunyn in

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1892, according to Kérr, Mensh and Gould[2] in 1950. These authors mention the importance of cholelithiasis as a cause of bleeding from the bile ducts and make the important observation that persons with "quiet" stones may have secondary anemia associated with the presence of occult blood in the stools, and they cite lichtman to the effect that there is evidence of gross hemorrhage in 1 to 5 per cent of all in which pathologic conditions of the gallbladder are present.

Hemorrhage from the extrahepatic bile ducts is difficult to diagnose; stone, rupture or aneurysm, erosion of vessels, penetrating duodenal ulcer, and tumor are all possibilities. Carcinoma of the ampulla of Vater is an occasional cause of obscure gastrointestinal bleeding.

REPORT OF A CASE

The patient, a married man aged 43 and a fitter by occupation, had complained of abdominal pain and dyspepsia since 1947. He had been told that he had gallstones. In 1948, after a drinking bout, he felt some pain that was for the first time associated with jaundice, which lasted five days. In November 1950 jaundice, pain and fever developed. He consulted Mr. A. Radford of Durban, who instituted conservative treatment for a week and then, on November 11, removed the gallbladder, which contained stones, and explored the common bile duct, removing two small stones. Mr. Radford was satisfied that the common duct was clear and the ampulla widely dilated. He commented that, in his opinion, the two small stones in the common duct were not the cause of the jaundice, as the ampulla was observed to be widely dilated. It was his impression that the patient had passed the obstructing stone.

The patient resumed work in February 1951. In March he had severe pain in the pit of the stomach, which differed from his previous pain. He passed blood per rectum but returned to work next day. In June he had short spasms of the same kind. On June 26 he suffered intense pain and collapsed owing to hemorrhage. On June 28 he was admitted to the European Hospital, Luanshya, Northern Rhodesia, under the care of the Chief Medical Officer, Mr. A. C. Fisher, M.D., F.R.C.S. (Eng.), who wrote:

"The patient was anemic, giving a history of dyspepsia, and had vomited blood and passed dark blood per rectum. Nine months previously he had had his gallbladder removed for stones by Mr. Radford in Durban. He was treated as a peptic ulcer patient for about ten days but had repeated hemorrhages while under treatment. Finally it became clear that surgical intervention was necessary, and I performed a laparotomy, expecting to do a gastric resection for bleeding peptic ulcer. I found no peptic ulcer but, on further dissection, a greatly distended common bile duct. When this was opened a large amount of clot was disclosed, including two or three biliary calculi. Hemorrhage started when the clot was removed and appeared to come from the posterior aspect of the common hepatic duct. It was not controlled by compression of the portal vein. The bleeding was bright blood but was not arterial. I could not palpate an aneurysm or growth. Gelfoam tamponade arrested the bleeding without difficulty, and the abdomen was closed with a catheter in the common duct and a drain in the subhepatic pouch. Convalescence was reasonably smooth, and no further bleeding occurred for a fortnight. Since then, however, the patient has had two further hemorrhages, large amounts of blood being lost each time. I am not clear as to what can be done for this man. My own theory is that there is an erosion in the portal vein from the common hepatic duct."

The patient was admitted to the Lady Dudley Nursing Home, Johannesburg, on August 10. His appetite was good. He had lost 30 pounds (13.6 Kg.) of weight in six weeks. He was a nonsmoker. He went on periodic bouts of heavy drinking. He had been a Marine from 1929-1934. During this period he had spent two years in the Gulf of Mexico.

Examination showed him to have a healthy appearance. The liver and spleen were not palpable. There was no jaundice. The left testis was atrophic. Beyond these data the physical examination was noncontributory. Tests for syphilis gave negative results. The venous blood on August 10, the day of admission, contained 3,080,000 erythrocytes and 6,000 leukocytes per cubic millimeter. The value for hemoglobin was 7.8 Gm. per hundred cubic centimeters. Polymorphonuclears included 59 per cent neutrophils, 1.5 per cent eosinophils, and no basophils. There were 2 per cent monocytes and 37.5 per cent lymphocytes. The packed cell volume was 27 volumes per cent. The erythrocytes showed anisocytosis, poikilocytosis and hypochromia.

Some cells showed diffuse polychromasia. Hypochromic anemia was present. There were 215,000 platelets. The bleeding time (Copley-Lalich) was one minute and fifteen seconds (normal maximum three minutes). The coagulation time (Lee-White) was six minutes (normal six to fifteen minutes). Hess' capillary resistance test gave negative resuits. The value for clot retraction was 74 per cent (normal range 48 to 64 per cent). The prothrombin index was 89 per cent. There was no evidence of a hemorrhagic diathesis or of blood dyscrasia.

A thymol turbidity gave a value of 1 unit; a thymol flocculation test yielded a negative result. The value for gamma turbidity was 6.2 units (normal maximum, 6 mg.) and that for gamma globulin 1.33 Gm. per hundred cubic centimeters (normal maximum 1.25 Gm.).

The value for serum bilirubin was 0.5 mg. per hundred cubic centimeters (normal range 0 to 1 mg.). The level of alkaline phosphataes was 7.1 King Armstrong units (normal range 5 to 10 units). The serum protein level per hundred cubic centimeters was 5.7 Gm.; the serum albumin level, 4.1 Gm., and the serum globulin level (by difference) 1.6 Gm. The albumin-globulin ratio was 2.6/1.

The Takata-Ara Test (Ucko's modification) yielded a negative result.

There was no biochemical evidence of intrahepatic damage.

On September 20 the venous blood contained 4,720,000 erythrocytes per cubic millimeter, with 14.6 Gm. of hemoglobin.

First Operation (Aug. 22, 1951).—This was actually the third operation on the common duct. The common duct was explored after a very difficult dissection. The duct was opened at the site of the previous exploration. It was wide, and the ampulla was widely patent. The left hepatic duct could be probed much further than is normally possible and was dilated. A probe passed for the normal distance into the right hepatic duct. No débris, growth or aneurysm was detectable. The duodenum was opened and inspected. No pathologic condition was present. The liver, pancreas, stomach and spleen were normal. The common duct was sutured. A drain was brought out from Morrison's pouch.

The patient's recovery from the operation was uneventful. As a vascular tumor was considered the most likely cause of the hemorrhage, it was decided to administer high voltage roentgen therapy in the hope that some benefit would accrue. Three days after the course was begun, violent bleeding occurred via mouth and bowel. It lasted for three days. The therapy was discontinued for a week and then resumed. Three weeks later hemorrhage occurred again, associated with severe abdominal and lumbar pain. On October 9 the patient was jaundiced for the first time. On October 16 the value for serum bilirubin was 16 mg. per hundred cubic centimeters and that for alkaline phosphatase 20 units. The Takata-Ara reaction was triple positive.

On November 3 the value for serum bilirubin was 3.2 mg. The jaundice remained at about this level. At the insistent request of the patient and his relatives, a further exploration was carried out.

Second Operation (actually the fourth).—On November 12 exploration showed the liver to be normal in size and appearance. The spleen had become enlarged to about four times the normal size. The stomach was opened so that the surgeon's hand could be inserted. No abnormality was seen or palpated in the stomach or the lower part of the esophagus. The duodenum was opened. No abnormality was seen. Bile trickled from the ampulla. The common duct was not opened, because it had been repeatedly explored and no abnormality could be palpated within it. The pancreas was normal. The portal vein was enlarged. The wound healed well. On the eleventh postoperative day (November 23) the patient went into rapid collapse owing to profuse hematemesis. He recovered well with appropriate treatment.

On November 29 the patient collapsed again. He vomited about 2 pints (0.9 liter) of blood and passed about 1 pint (0.45 liter) per anum. He died the same day. In four months he had sustained 17 severe hemorrhages.

Postmortem Data.—There was generalized pallor of the skin and mucous membranes. The peritoneal cavity contained blood-stained fluid. The intestine contained 3 or 4 pints of blood (1.2 to 1.6 liters). There was blood-staining throughout the intestine, particularly the terminal portion of the ileum, the cecum and the ascending colon. The liver was enlarged and flabby, and there was mottling of the surface. On section the right lobe was pale and flabby, with a small abscess in the region of the gallbladder fossa. Focal fatty change and excess fibrous tissue were present in the left lobe. The common bile duct was grossly dilated and contained blood

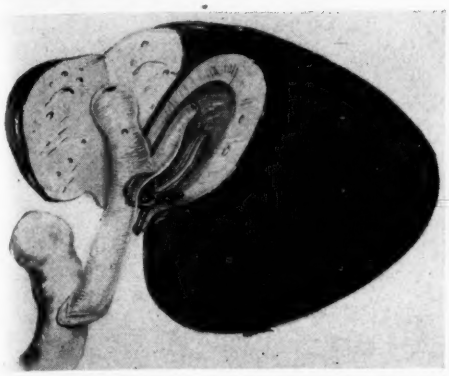

Fig. 1.—Exposure from front of aneurysm of right hepatic artery, demonstrating projection into the common hepatic duct. Note that duct is formed within the liver. Inset demonstrates the aneurysm on a branch of the right hepatic artery.

clot. There was communication between the common hepatic duct and a branch of the right hepatic artery, with thrombosis at the site of anastomosis.

Note: The common hepatic artery was formed within the liver, and the aneurysmal communication with the duct was 1 inch (2.5 cm.) above the porta hepatis within the liver (Figs. 1 and 2).

Aneurysm of the Hepatic Artery.—This condition is rare. Friedenwald and Tennebaum[3] in 1923 were able to collect 65 cases. Malloy and Jason[4] in 1942 collected 85, and in the next year Gordon-Taylor[5] (1943) described the 86th case, mentioning 1 which had not been published. The male-female ratio was 3 to 1; the youngest patient in any recorded case was 10 years of age and the oldest 83. The condition is three times as common outside the liver as within it.

In about 8 per cent of the cases more than one aneurysm existed. The size as usually given varied from that of a barleycorn to that of a full-term fetal head.

The hepatic artery itself is much the commonest situation. Malloy and Jason[4] in 1942 gave the following figures for the 84 cases they assembled:

Hepatic artery, 40; right branch, 26; left branch, 7; both right and left branches, 1; cystic artery, 3, and gastroduodenal artery, 1.

Infection is listed as much the commonest cause of the condition; arteriosclerosis and trauma come next. Syphilis is an unusual cause, although here as elsewhere in the body the rule obtains that the more peripherad the aneurysm the less likely is it to be syphilitic.

Gordon-Taylor[5] in 1943 stated that in 80 per cent of cases the presenting symptom is rupture of the aneurysm, in nearly half of the cases bursting into the peritoneal cavity and in one-third into the extrahepatic bile ducts. Occasionally the rupture may be into the duodenum or the gallbladder.

The symptoms to be expected in cases of aneurysm of the hepatic artery are pain, hemorrhage and jaundice. Malloy and Jason[4] (1942) list this triad as the most usual, commenting, however, on the possible variability of symptoms. The pain, much the commonest symptom, is epigastric or in the right hypochondrium and may be constant or colicky—precisely similar to the pain caused by gallstones.

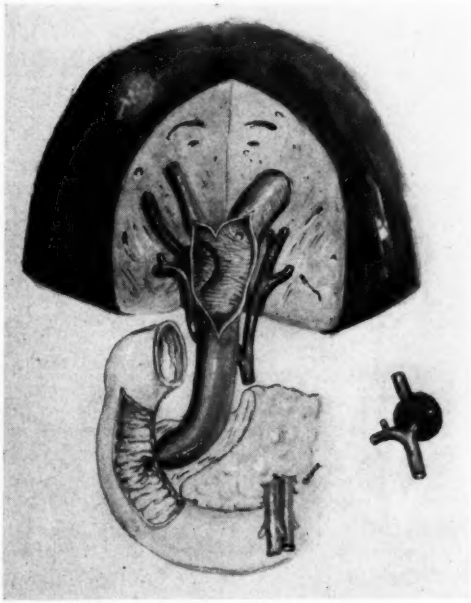

Fig. 2.—Rupture of the aneurysm into the common hepatic artery. The specimen is viewed from behind.

Hemorrhage may occur as occult blood in the stools causing secondary anemia, or it may be profuse, appearing as hematemesis, melena or both. If rupture does not occur into a channel that permits escape to the exterior, the signs may be those of internal hemorrhage. Jaundice is a less common symptom. It is of the obstructive type and not usually severe.

Diagnosis.—Malloy and Jason[4] stated that aneurym of the hepatic artery has only twice been diagnosed before operation or death. A condition of such rarity does not ordinarily receive consideration in differential diagnosis. In the presence of pain in the epigastrium, jaundice and hemorrhage, aneurysm of the hepatic artery should be considered as one of the several possibilities. Rarely indeed does a pulsating tumor supply a more direct clue. In the case here presented jaundice was a late symptom and was not severe.

Treatment.—Most aneuryms of the hepatic artery rupture into the peritoneal cavity or the extrahepatic bile ducts. The mortality rate is extremely high; Malloy and Jason could find only 2 cases of success following ligation of the hepatic artery, though they stated that some patients recover spontaneously.

Gordon-Taylor[5] (1943) stated that "ligature of the hepatic artery or its main branches is an operation fraught with danger to life." This is in accord with surgical experience in general.

The surgical treatment of aneurysm in general has not been very successful, and in this respect the results of treatment of aneurysms of the hepatic artery are not surprising, though failure in this instance implies the death of the patient. The peculiar features of the blood supply of the liver and recent work on the cause of death following ligation of the hepatic artery warrant the hope that the procedure may be not quite so hazardous in the future.

The Hepatic Artery.—This branch of the celiac artery gives off the right gastric, the large gastroduodenal and the small duodenal arteries. There is free anastomosis between the hepatic, the left gastric, the splenic and the superior mesenteric arteries. There is an accessory hepatic artery in over 30 per cent of the cases. It arises from the celiac, the left gastric, the superior mesenteric or the splenic artery.

It has been axiomatic that ligature of either the right or the left hepatic artery is fraught with grave danger because of hepatic necrosis. Gordon-Taylor[5] (1943) stated: "There can be no manner of doubt that the anastomosis between the arteries in the interior of the liver is infrequent and at best scanty." Segall[6] (1923) studied the vascular architecture of the liver post mortem. He found that the anastomoses between the blood vessels in the liver was made up of vessels larger than capillaries. An emulsion injected after ligation of either the right or the left hepatic artery filled the entire arterial tree. The branches of the hepatic vessels anastomosed with the subcapsular vessels. The inferior phrenic vessels were filled when an emulsion was injected into the hepatic arteries. In experimental work in dogs, Tanturi, Surgart and Canepa[7] showed that (a) the collateral arterial supply of the liver in dogs is inferior to that in man; (b) the ligation of the hepatic arteries proper in the dog produced a mortality percentage of 68.7; (c) death was due to a factor not specifically related to the arterial supply of the liver cells; (d) this factor was the growth and proliferation of anerobic bacteria, and (e) treatment with penicillin for four days after the operation prevented death in 8 dogs (100 per cent).

COMMENT

When serious hemorrhage occurs via the bile ducts, two problems confront the clinician—diagnosis and treatment. When the loss of blood threatens life and operation is imperative, the surgeon will find blood in the stomach and intestine. When an intrahepatic aneurysm of the hepatic artery exists, it is probable that there will be no visible or palpable evidence of its existence. That the bleeding is coming

via the bile ducts is likely to escape the surgeon's notice unless he remembers the possibility and examines the ducts. In the case reported here, the surgeon, having failed to find a peptic ulcer as the cause of the bleeding, exposed the common bile duct, which was greatly distended and contained blood clot and calculi. There was no evidence of aneurysm, and subsequent detailed investigation failed to disclose any cause for the bile duct's bleeding. In all, three explorations of the bile ducts were carried out—two during periods when no bleeding was in progress. All failed to establish a diagnosis. Sir Stanford Cade was in Johannesburg at this time, and when he was told about the case he suggested a vascular tumor of the liver as a possible explanation.

Faced with this problem, what course should the surgeon pursue? Having established by operation the fact that the bleeding is coming via the bile duct, he should explore this structure. If no cause is found and the hemorrhage has been severe and possibly one of several such episodes, the surgeon has various courses open to him:

1. He may close the abdomen so that general investigation of the patient may be carried out. In a case like the one here described this procedure will be futile.

2. Should he have assurance from preoperative study that there is no cause for the hemorrhage such as blood dyscrasia, hepatic disease, etc., he may, in view of the high morality rate associated with aneurysm of the hepatic artery, decide to treat the condition as such, appreciating that it is only one of several possibilities. The only treatment then is ligature of the hepatic artery. Should the bleeding be arising from a vascular tumor, the procedure may produce palliation by reducing the intrahepatic arterial pressure. Should such an aneurysm exist, the operation does give prospect of cure.

Where Should the Ligature Be Applied?—Kehr[8] (1903) ligated the hepatic artery distal to the gastroduodenal branch. The artery has been successfully ligated proximal to its branches.

Ligature of the hepatic and/or splenic arteries at their origin from the celiac artery has been carried out for cirrhosis of the liver in man. Berman, Koenig and Muller,[8] who have studied this matter, stated in 1951 that their investigations seem to show that liver tissue is not damaged by ligation of these arteries provided the ligation is close to the source of supply. Grindlay, in a discussion of this paper, stated that the liver will not survive if the hepatic artery branches are tied as they enter the liver.

Ligature of the hepatic artery before it gives off its branches may help an aneurysm inside the liver by a temporary lowering of the pressure. It would not cause necrosis of the liver. The collateral circulation is so generous, however, that pressure in the hepatic artery distal to the ligature would soon be as high as it was before the operation.

Ligature of the hepatic artery proper just before it divides to enter the liver would seem, in view of the work of Tanturi, Surgart and Canepa (mentioned previously), to be justifiable and not too great a surgical hazard, provided that pencillin was administered as advised by these authors. Their dogs recovered despite the point they make, that the collateral supply to the liver is better in man than in dogs.

Ligature of one branch of the hepatic artery is also a possibility. In the case here reported a probe entered the left hepatic duct for some distance. It was obstructed within the liver when pushed up the right hepatic duct. In the light of subsequent knowledge of the case, the proper procedure would have been ligature of the right hepatic artery.

I have tied this vessel when it was damaged during cholecystectomy, without harm to the patient. The collateral circulation between the right and the left lobes of liver would, according to Segall, appear adequate. Penicillin should be routinely given if the hepatic vessels have been tied.

CONCLUSIONS

Aneurysm of the hepatic artery presents problems with regard to diagnosis and

treatment. The mortality rate is very high. Intrahepatic aneurysm cannot usually be diagnosed. For repeated exsanguinating hemorrhages via the bile ducts for which no cause can be found, the only chance of saving the patient's life is offered by ligation of the hepatic artery. Recent research suggests that the ligature may be applied to the hepatic arteries proper if necessary safeguards are provided.

CONCLUSÒES

Os aneurismas da arteria hepatica oferecem problemas tanto de ordem diagnostica como de natureza terapeutica. A taxa de mortalidade é muito alta. O aneurisma intra-hepatico não pode sêr comumente diagnosticado. Para asperdas sanguineas frequentes através os canais biliares, cuja causa não se consegue atinar, o unico processo de salvar a vida do doente será a ligadura da arteria hepatica. Estudos recentes sugerem que a propria ligadura da arteria hepatica seja feita se cuidados extrêmos são recomendados.

SCHLUSSFOLGERUNGEN

Aneurysmen der Leberarterie bieten sowohl diagnostische als auch therapeutische Problem. Die Sterblichkeitsrate ist sehr hoch. Intrahepatische Aneurysmen koennen im allgemeinen nicht diagnostiziert werden. Bei Faellen von unerklaerlichen erschoepfenden Blutverlusten auf dem Wege der Gallengaenge liegt in der Ligatur der Leberarterie die einzige Moeglichkeit, das Leben des Kranken zu retten. Neuere Forschungen fuehren zu der Annahme, dass, wenn die notwendigen Vorsichtsmassnahmen zur Anwendung gelangen, die Unterbindung an den Leberarterien selbst vorgenommen werden kann.

CONCLUSIONI

L'aneurisma dell'arteria epatica offre problemi diagnostici e terapeutici; la mortalità è assai elevata. L'aneurisma intraepatico è di solito impossibile da diagnosticare. A causa delle ripetute emorragie dissanguanti che avvengono attraverso la via biliare e per le quali non si può trovare una causa, l'unica possibilità di salvare la vita del paziente è rappresentata dalla legatura dell'arteria epatica. Ricerche recenti sembrano dimostrare che tale legatura può farsi, ammesso che si prendano gli opportuni provvedimenti.

RÉSUMÉ

L'anèvrisme de l'artère hépatique soulève un problème de diagnostic et de thérapeutique. Le taux de mortalité est très élevé. Son diagnostic est difficile à faire. Tout patient que présente des hémorragies profuses de ses canaux biliaires, doit subir une ligature de l'artère hèpatique. Ceci peut se faire avec certaines précautions.

CONCLUSIONES

Los aneurismas de la arteria hepática presentan problemas diagnósticos y terapeúticos. El grado de mortalidad es muy elevado. El aneurisma intrahepático generalmente no puede ser diagnosticado. En las hemorragias repetidas vía conductos biliares, el único medio de salvar la vida del paciente es la ligadura de la arteria hepática. Investigación reciente sugiere que la ligadura puede ser aplicada a las arterias hepáticas en forma apropriada si se tienen las precauciones necesarias.

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Total Obliteration of Artery Due to Spasmodic Obstruction: Operative Verification

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ANATOMICALLY and pathologically verified cases of the type herein to be described are very uncommon. I reported the first case in 1949, an operative case of goiter. The postoperative sequelae were dramatic.[1] This earlier case will be summarized after my report of the more recent one, which was briefly as follows:

A woman aged 60 was referred to this clinic with a diagnosis of thrombosis of the right leg. The patient had been deaf since of the age of 25. At the age of 15 she had had diphtheria, and at the age of 42 she had undergone cholecystectomy and appendectomy. One year prior to her appearance at the clinic, both eyes had been surgically treated for cataract. In March 1951 she had had thrombosis of the right leg, which was cured in three weeks by the administration of priscol. There was a recurrence on November 5.

Physical examination revealed that the patient weighed 47 Kg. The pulse was weak and irregular; the blood pressure in millimeters of mercury was 120 systolic and 50 to 100 diastolic. The results of oscillometric tests were 0.5 to 1 for the right arm and 2 for the left. There was diffuse alteration of the myocardium. The electrocardiogram showed auricular fibrillation.

On admission to the hospital the toes of the right foot were much colder than those of the left. The right leg was icy up to the midpoint. There was slight hyperesthesia of the toes of the right foot. The pedal and the posterior tibial arteries were impalpable.

Niconacide, 3 tablets daily, was prescribed, in addition to spasmolytic analgesics (morphine and atropine) for three days, to lessen the spasm. On Dec. 8, 1951, an arteriogram was made (Figs. 1*A* and 2*A*). Another was taken one hour later to make sure that the obstruction was not due to spasm (Fig. 1*B*). In the second picture we noticed arrest at the femoral artery and, at a hand's breadth above the knee joints, the development of a very fine collateral circulation.

On December 10, we decided to perform an arteriectomy and later to add a lumber sympathectomy and a venous anastomosis, since the arteriogram showed that the passageway of the principal artery in the lower part of the thrombotic area was free and largely permeable beyond the obliterated segment. It is known that, unless the arterial passageway is freely permeable below the obliterated region, the results will be bad.

I operated on December 11. With the patient lying on the abdomen, a transverse incision was made, the surgeon's fingers being pressed below the precondylar line in the popliteal region. The incision was extended upward and the popliteal artery exposed. At first, I received the impression that this artery was hard, but in dissecting it, I saw that it was not thrombosed; it was pulsatile. I dissected upward to Hunter's canal, at which level I found that the artery also pulsated. I was astonished at this vascular condition and was forced to the conclusion that, since the patient had suffered a great deal, the discomfort must be due to vascular spasm causing circulatory disturbances.

I proceeded to do a sympathectomy extending from the popliteal artery to the

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Fig. 1.—*A*, circulation stoppage from the arteria femoralis at the level of Hunter's canal. *B*, second arteriograph, taken one hour later, with the same result. *C*, femoral artery again permeable.

artery at the level of Hunter's canal. After this operation the arterial oscillations were normal. The stoppage, therefore, must have been due to spasm.

In this particular case, I am pleased to have performed a minimal operation. The arrhythmic state of the heart, however, has not ceased to worry me, although the postoperative course has been good. Four weeks after the operation, another arteriogram (Fig. 1*A*), was taken which showed the femoral artery restored to permeability. The posterior and anterior tibial arteries were more clearly defined (Figs. 1*C* and 2*B*).

Summary of Earlier Case.[1]—The patient, a woman, was born on May 5, 1891, and died on Jan. 31, 1947. The family history contained nothing of note except that a sister had died of a "stroke". The patient's personal history was also irrelevant. Since the onset of the present illness, she had consulted Dr. K. for nervous and psychic troubles and was hospitalized for six months in a home for persons with nervous conditions.

Physical examination revealed the patient to be well nourished. No fever, heart murmurs, no edema, no cyanosis, no rales and no dyspnea could be observed. The pulse was regular. The respiratory, digestive and urogentital systems were normal, as was the nervous state.

There was a small medial goiter, with

Fig. 2.—*A*, small diameter of tibialis anterior and posterior. *B*, anterior and posterior arteria tibilias anterior and posterior are wider, tibial arteries; note widening.

enlargement of the lateral lobes of the thyroid. The blood pressure in millimeters of mercury was 160 systolic and 150 diastolic. The patient complained of nervousness, palpitations, insomnia, general tremors, emaciation for the past two years, unsociability, emotional instability and fatigue.

The Volhardt reaction was normal. The basal metabolic rate was 40. On Jan. 10, 1947, at 10 a. m., ligation was performed on the enlarged right upper lobe of the thyroid and also on the right lower lobe, which was equally enlarged. The right lobe was resected without incident. The left thyroid arteries, superior and inferior, were ligated. At the moment of resection of the left lobe, although the re-

section was superficial, the patient went into cardiovascular collapse. Coramine and epinephrine were administered. The collapse was overcome; the pulse rate was 86 and the blood pressure 15 systolic and 8 diastolic, but the patient remained in coma. For the rest, there was absence of the reflexes in the upper extremities; a bilateral Babinski sign was in evidence; the right eye deviated to the right, but the ocular reflexes were present. At 7 p.m. a second collapse occurred. A transfusion of serum and physiologic solution of sodium chloride was given, and percotene was administered. There was another improvement; the blood pressure 160 millimercury was 16 systolic and 100 diastolic. A third collapse took place at 9 p.m., with complete arreflexia, stertorous breathing and death. The anatomopathologic diagnosis was proliferating macrofollicular colloid goiter.

Autopsy revealed a subtotal thyroidectomy. There were multiple small meningeocortical areas of softening, very recent, in the left hemisphere of the brain, but no obliteration of the carotid controls at any point in their courses. The heart was dilated. There was pulmonary edema. Stasis of the central lobe of the liver was observed. The convexities of the brain showed distinct asymmetry, the left hemisphere being larger than the right and its convolutions tauter. The meninges were soft and thin, with marked venous stasis; on the convexity of the left hemisphere, the pia mater was seen to contain very discrete sanginous suffusions throughout the frontal region. The corpus callosum was moderately taut. The vessels at the base of the brain were rather small but showed no arteriosclerosis, and no arterial obliteration.

Microscopic examination revealed beginning softening, with punctiform hemorrhages, in certain cortical areas marked by pallor and degeneration of the ganglionic cells. The small vessels showed maximal dilatation, with leukocytes in a marginal position. In the meninges were observed dilatation of the venules, vascular paralysis, edema, and a small peripheral zone of fibrinoid degeneration. The diagnosis was multiple small meningeocortical areas of softening, with punctiform hemorrhages due to hyperreflexia of the left carotid sinus; severe degeneration of the ganglionic cells and a recent lesion of the meningeal venules. There was no obliteration of the carotid controls at any point in their courses, nor was there any arterial obliteration at the base of the brain. There was no hemosiderinemia, no glial reaction and no neurophagia.

COMMENT

The incidence of such cases is not great. The more recent case here described is interesting because cure was accomplished with minimal surgical intervention after it had appeared that an arteriectomy and a venous graft would be required; the earlier case derives its chief interest from its surgicolegal aspect and the operative responsibility of the surgeon. It is not unknown in medical jurisprudence that a surgeon may be unjustly accused of ligating the carotid artery, when what has been ligated, as in my operation for goiter in the earlier case, is the inferior thyroid artery. It stands to reason that, in a case of hyperreflexia of the carotid sinus below the brain, the hyperreflexia has nothing to do with the surgeon's maneuvers in an operation for goiter. As in the earlier case here described, this hyperreflexia provokes localized spasm and hardening of the cerebral arteries, and the reflexes provoke spasm of the femoral artery. The cerebral arteries do not have collaterals as do the femoral arteries; as a result, cerebral anemia produces an irreversible lesion.

SUMMARY

First Case.—The patient, a woman 60 years of age, felt sudden intense pain in the right leg, with edema. Arteriographic studies made twice revealed total obliteration of the femoral artery at the level of Hunter's canal. Perifemoral and peripopliteal sympathectomy was performed;

cure resulted. The pain, the cyanosis and the edema disappeared. An arteriogram taken one month after the operation showed almost total permeability of the artery.

Second Case.—The patient, a woman 56 years old, had bilateral median goiter. Resection of the right lobe of the thyroid was performed and was well tolerated, but when the left lobe was superficially resected the patient immediately went into coma. Intensive therapy was administered, but death occurred two days later. Autopsy revealed no thrombosis of the carotid artery, either external or internal. There was softening of the brain at the left side, due to hyperreflexia of the carotid sinus.

These 2 cases are examples of arterial obliteration not caused by mechanical obstruction but due to spasmodic contraction. The first case is interesting because of the unexpected cure with a minimal operation; the later case has surgicolegal importance, since a surgeon may be unjustly accused of having ligated the carotid artery.

RIASSUNTO

Caso I. La paziente, una donna di 60 anni, avvertì improvvisamente un intenso dolore alla gamba destra con edema. Lo studio arteriografico, ripetuto 2 volte, mostrò un'obliterazione completa della femorale nel canale di Hunter. Si eseguì una simpatectomia perifemorale e peripoplitea, con successo: il dolore l'edema e la cianosi scomparvero. A distanza di un mese l'arteriografia mostrò la ricanalizzazione quasi completa dell'arteria.

Caso II. La paziente, una donna di 56 anni, aveva un gozzo mediano bilaterale. Si eseguì la resezione del lobo destro e l'intervento fu sopportato bene ma, durante la resezione parziale del lobo sinistro, la paziente entrò improvvisamente in coma. La morte sopravvenne 2 giorni dopo nonostante una energica terapia. All'autopsia non si trovò trombosi della carotide esterna e interna. Vi era, invece, un rammollimento dell'emisfero sinistro dovuto ad iperriflessia del seno carotideo.

Entrambi i casi dimostrano la possibilità di occlusioni arteriose non dovute ad ostacolo meccanico ma a contrattura spastica. Il primo è interessante per l'inatteso successo di una terapia chirurgica di minime proporzioni, il secondo per i riflessi chirurgo-legali in quanto il chirurgo potrebbe essere accusato di aver legato la carotide.

SUMARIO

Primeiro caso.—A paciente, uma mulher de 60 anos de idade, sentiu subita e intensa dôr na perna direita com edema. Estudos viteriograficos feitos duas vezes revelaram obliteração total da arteria femural ao nivel do canal de Hunter. Simpatectomia perifemural e peripoplitea foi executada com cura resultante. A dôr, a cianose e o edema desapareceram. Um arteriograma tomado um mez depois de operação mostron quasi total permeabilidade da arteria.

Segundo caso.—A paciente, uma mulher de 56 anos de idade, so fria de bocio mediano bilateral. A ressecção do lobo direito da tiroide foi executada e foi bem tolerada, mas quando o lobo esquerdo foi superficialmente ressacado o paciente entron imediatamente em coma. Terapeutica intensa foi aplicada mas a morte ocorren dois dias depois. A autopsia não revelou trombose da arteria carotida, seja externa ou interna. Havia amolecimento cerebral do lado esquerdo devido a hiperreflexão do seio carotidiano.

Esses dois casos são exemplos de obliteração arterial não causados por obstrução mecanica mas devidos a contração espasmodica. O primeiro caso é interessante por causa da cura mesperada com uma operação minima; o sugundo caso apresenta importancia medico-legal desde que o cirurgião pode ser injustamente acusado de ter ligado a arteria carotida.

ZUSAMMENFASSUNG

Erster Fall: Eine 60-jaehrige Frau erlitt einen ploetzlichen heftigen Schmerz und ein Oedem des rechten Beines. Zweimal ausgefuehrte arteriographische Untersuchungen erwiesen eine voellige Verstopfung der Oberschenkelschlagader in Hoehe des Hunterschen Kanals. Es wurde eine perifemorale und peripopliteale Sympathektomie ausgefuehrt, die zur Heilung fuehrte. Schmerz, Zyanose und Oedem verschwanden. Eine einen Monat nach der Operation vorgenommene Arteriographie zeigte eine fast voellige Durchgaengigkeit der Schlagader.

Zweiter Fall: Eine 56-jaehrige Frau hatte einen beiderseitigen mittelstaendigen Kropf. Die Resektion des rechten Schilddruesenlappens wurde gut vertragen. Bei der oberflaechlichen Resektion des linken Lappens jedoch verfiel die Patientin sofort in ein Koma. Trotz umfangreicher therapeutischer Massnahmen erfolgte nach zwei Tagen der Tod. Die Obduktion ergab keine Thrombose der Halsschlagader, weder der inneren noch der äusseren. Es lag eine linksseitige Gehirnerweichung als Folge eines uebersteigerten Reflexes des Karotissinus vor.

Diese beiden Faelle sind Beispiele von nicht durch mechanische Verstopfung sondern durch krampfhafte Kontraktion hervorgerufenen Schlagaderverschlüssen. Der erste Fall ist interessant wegen der unerwarteten mittels eines geringfuegigen chirurgischen Eingriffs erzielten Heilung. Der zweite Fall hat gerichtsmedizinische Bedeutung, weil der Chirurg ungerechterweise beschuldigt werden koennte, die Halsschlagader unterbunden zu haben.

RÉSUMÉ

Premier cas.—Une patiente, agée de 60 ans, ressentit une douleur aigue subite dans la jambe droite, un oedème s'ensuivit. Deux artériographies révèlent une oblitération complète de l'artère fémorale à la région du canal de Hunter. Une sympathectomie périfémorale et péripoplitée amena la guérison. La douleur, la cyanose et l'oedème disparurent. L'artériographie prise un mois après l'opération démontre une perméabilité presque complète de l'artère.

Second cas.—Une patiente, agée de 56 ans, présentait un goître médian bilatéral. La résection du lobe droit de la thyroïde fait, fut bien tolérée. Par contre, la résection superficielle du lobe gauche plongea la patiente dans le coma. Malgré une thérapeutique énergique, la mort s'ensuivait deux jours plus tard. La nécropsie n'a pu démontrer de thrombose de la carotide soit externe soit interne. On a trouvé du ramollissement cérébral à gauche.

Ces deux cas sont un exemple d'oblitaration artérielle due non pas à de l'obstruction mécanique mais à une contraction spasmodique. Le premier a de l'intérêt par la guérison secondaire à une intervention bénigne; le second a une importance médicológale; puisque souvent in justement on peut accuser le chirurgien d'avoir ligaturé la carotide.

RESUMEN

Se presentan dos casos de obliteración arterial por contracción espasmódica y no obstrucción mecánica. El primero es interesante por su curación inesperada con una operación mínima, el segundo por su importancia quirúrgicalegal, tenida cuenta de que un cirujano puede ser acusado injustamente de haber ligado la arteria carótida.

En el primer caso se trató de una mujer de 60 años de edad, quejándose de súbito e intenso dolor con edema de la pierna derecha. Arteriográficamente se constató obliteración total de la arteria femoral a nivel del canal de Hunter. Se efectuó simpaticectomía perifemoral y peripoplítea con resultado satisfactorio. Desaparecieron dolor, cianosis y edema. Arteriográficamente se comprobó casi total permeabilidad arterial un mes después de la operación.

En el segundo caso se trató de una mujer de 56 años de edad, con bocio

mediano bilateral. Se hizo resección del lóbulo tiroideo derecho bien tolerada, pero al efectuarla superficialmente en el izquierdo se presentó inmediatamente estado de coma. Terapéutica intensiva y muerte a los días. Ningún dato necrópsico de trombosis de la arteria carótida, externa o interna. Reblandecimiento cerebral izquierdo por hiperreflexia de seno carotídeo.

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Sinus carotidien (goitre et hémiplégie); Rev. neurologique 81, No. 10, October, 1949.

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Experimental Demonstration of an Antiamylase in Dogs

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THERE are various pathogenic theories of acute hemorrhagic pancreatis. In 1901 Opie expressed the opinion that, supposing a common biliary-pancreatic duct existed, disturbance of the biliary flux because of the presence of gallstones might cause acute pancreatitis. An important objection to this theory was Schmieden and Sebening's observation that of 1,200 common ducts, a gallstone was found in the ampulla in only 4.4 per cent. The obstruction concept of Opie was supported afterward by Archibald, who suggested that spasm of the sphincter of Oddi, causing a bile reflux in the pancreas, was the cause of the illness.

The anatomic researches of Mann and Giordani have shown that the opening of the sphincter of Oddi is generally at the summit of the bile papilla in the second part of the duodenum (common duct). Moreover, fibers from the sphincter of Oddi surround also the duct of Wirsung, which, when closed by contraction of the sphincter of Oddi will also obstruct the pancreatic ducts.

The biliary reflux theory is favored by important radiologic researchers. Best and Hicken have observed that, in the presence of disease of the biliary tract, lipiodol injected into the tract may find its way into the duct of Wirsung (in about 20 per cent of cases). There is disagreement among some authors, when biliary reflux is obtained in a case of disease of the biliary tract, as to the manner in which bile may produce the illness. Some stress the mechanical factor, i.e., the increase of intrapancreatic pressure that may break the pancreatic acini, thus liberating the enzymes. Guleke (in 1904) and Polya (in 1906) theorized that trypsingogen might be activated by biliary reflux. In 1934, Dragstedt suggested the possibility of an infectious etiologic factor, caused by the growth of anaerobic bacteria in the "pabulum" formed by bile salts. Other authors, particularly Rich and Duff (1936), showed metaplasia of the epithelium of the pancreatic ducts causing high pressure of stagnant pancreatic juice breaking up acini and interfering with trypsinogen activation by the interstitial connective tissue. One of the most important facts discussed by these authors was that trypsinogen may be activated not only by enterokinase but by the tissue fluids.

Trypsin, because of its proteolytic properties, is responsible for the hemorrahagic aspect of pancreatitis (destruction of vessel walls); lipase is responsible for fat necrosis. If pancreatic juice is injected into the subcutaneous tissue, both fat and hemorrhagic necrosis occur, supporting Rich and Duff's hypothesis. But trypsin can be activated also in other ways, as by leaving pancreatic tissue in a slightly acid solution, or by small doses of already activated trypsin.

Northrop and Kunitz have studied the problem by a chemical method, obtaining the following results: (a) in the natural, untreated extracts of pancreas, a factor inhibiting trypsin may be found; (b) with the addition of kinase to pancreatic extract, trypsin is produced in quantity, first to balance and then to overcome the inhibi-

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tive factor; (c) active trypsin may activate trypsinogen, and (d) an antitrypsin may be isolated by chemical methods from the pancreas.

The authors mentioned have introduced the importance of anti-enzymes in pancreatic physiopathology, and we have confined our researches to the same field.

Thus far, biochemical studies have revealed but few anti-enzymes. According to certain authors, it is established that the antitryptic properties of blood serum are increased in the presence of infectious diseases (pneumonia, malignant tumor) because of the formation of specific antibodies. It is thus clearly shown that there exists a definite equilibrium between proteolytic enzymes and anti-enzymes in granulocytes which produce a proteolytic ferment similar to trypsin, which is usually inhibited by an anti-enzyme present in blood serum. When inflammation occurs the number of granulocytes is greatly increased, a great amount of enzyme is formed, the anti-enzyme is overcome by the former and abscess formation eventuates.

Sumner in 1937 succeeded in immunizing rabbits against another enzyme, urease. This is generally very toxic and produces an anti-urease.

Among pancreatic enzymes, antotrypsin is already known. Fluorides are lipase inhibitors (chemical) as there is evidence of production of antilipase *in vitro*, against plant lipase. In animals, we have been able to produce antilipase by intravenous injection of heterogeneous animal lipase.

While, as stated, we were able to find that literature discloses contributions on the production of antitrypsin and an antilipase enzyme, we were unable to find anything about the inhibitory factors of amylase. It is notable that a study of antiamylase has been neglected, particularly in view of the fact that amylase, which increases rapidly in blood serum, is one of the most important signs of acute hemorrhagic pancreatitis.

Amylase and Its Properties. — Alpha amylase must be distinguished from beta amylase because the first mentioned produces dextrines and maltose, while beta amylase produces only maltose. The pancreatic enzyme is apha amylase. It is activated by calcium salts and destroyed by acids ($p\mathrm{H} = 3.3$). Intracellular amylases are of two types: desmoamylase, attached to the cellular structure, and lyoamylase (like the pancreatic one), loosely attached to the protoplasm.

Concentration of amylase in blood serum increases with the administration of vagus-stimulating drugs such as acetylcholine or methacholine, but the production of amylase decreases in pancreatectomized dogs or after ligation of the pancreatic duct.

In the presence of acute hemorrhagic pancreatitis, there is an increase of amylase and lipase in the blood serum. The increase in lipase is not constant and, according to many authors, is not of great significance. The maximum level of enzymes in the blood is reached after seventy two hours, then drops quickly. Increase of one of the two enzymes is not necessarily connected with increase of the second one. It is generally assumed that the increase of the enzymes in the blood serum is due to a mechanical factor, e.g., rupture of pancreatic acini. Radakovitch, Pearse and Strain, in a recent work on pancreatitis, stated: " . . . the ducts were ligated and the animals were allowed to eat on the first postoperative day. It was assumed that changes in the serum enzyme level were the result of the stimulation of the pancreas by food." These authors have succeeded in creating, in various ways, changes in the level of enzymes in the blood serum analogous to those of acute hemorrhagic pancreatitis; but the pathologic changes in the pancreas showed neither the character of fat necrosis nor the hemorrhagic manifestations. Moreover, they succeeded in creating the typical pathologic changes of acute hemorrhagic pancreatitis by a new method (administration of d, l-ethionine); but in these cases they observed no elevation of the enzyme level in the blood.

These recent observations support the conclusion that enzyme changes in the blood are not necessarily connected with acute hemorrhagic pancreatitis, since other conditions may cause them; the explanation on the basis of "acinar rupture" is no longer valid, as was shown by our researches. We advance a new hypothesis to explain the high level of amylase in the blood.

The concept that guided us in our research is that there must be, akin to the antirrypsin factor and the antilipase factor, an *antiamylase factor*. This we were able to establish.

The increase of amylase in blood serum in cases of acute pancreatitis can be explained in our opinion, on the basis of disequilibrium between the amylase and antiamylase.

Technic.—We have followed the technic of Bockus-Somogyi, modifying it slightly. Roughly, it is as follows.

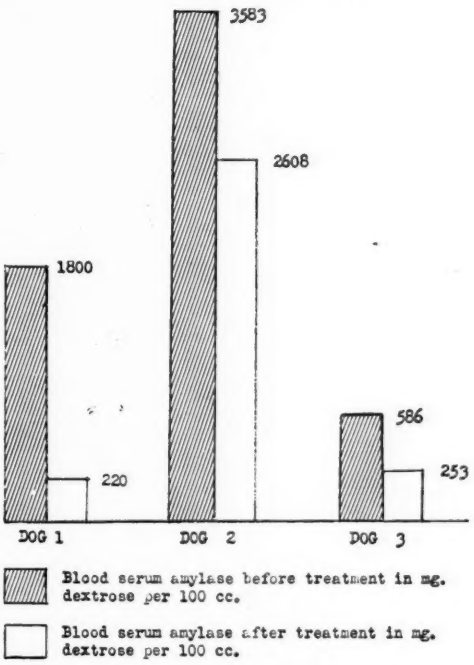
Prepare the following solutions: (a) starch solution, 1.5 per cent; (b) sodium chloride, 1 per cent; (c) No_2WO_4, 6 per cent, and (d) Benedict's solution for titration of dextrose. Three test tubes to contain

1. Serum, 1 cc.; sodium chloride, 2 cc.; starch solution, 5 cc.
2. Serum, 1 cc.; sodium chloride, 2 cc.; starch solution, 5 cc.
3. Distilled water, 1 cc.; sodium chloride, 2 cc.; starch solution, 5 cc.

The contents of the three tubes are well shaken.

Add 1 cc. of 1 per cent sulfate to Tube 2; incubate Tubes 1 and 3 for thirty minutes at a temperature of 40 C; add to Tubes 1 and 3 1 cc. of 1 per cent copper sulfate; add to the three tubes 1 cc. of Na_2WO_4; filter. Determine the dextrose content of each of the three tubes, using Benedict's reagent. The dextrose content of Tube 1, minus that of Tube 2, minus that of Tube 3, equals the amylase content in conventional units (milligrams of dextrose per hundred cubic centimeters of colution).

Titration of Solutions with Low Dextrose Content: A standard solution of 1 per cent dextrose is prepared, reducing a given volume of Benedict's solution. The solution with small dextrose content is mixed with the Benedict reagent; titration with the standard dextrose solution follows. A smaller than normal quantity of standard solution is needed to bring about the reaction; the difference between the volume normally needed and the volume needed after mixing Benedict's solution with the examined liquid enables one to calculate the titer of dextrose in the solution.



Experimental Work.—We have titrated the amylase in the blood serum of 3 dogs. Immediately afterward we began the injections of amylase (Merck Diastase, dissolved in distilled water at room temperature.) After a week or ten days of such treatment we made a second determination of the amylase activity. All our dogs have had severe diarrhea after the first or the second injection, generally disappearing a few days after the end of the treatment. In only 2 cases have we observed an

Results of Daily Injections of Amylase in 3 Dogs

Dog 1 (Medium-Sized)*
Titer before treatment: 1,800 units
Treatment: daily injections of amylase
4 cc. amylase 0.2%
3 cc. amylase 0.5%
3 cc. amylase 0.5%
3 cc. amylase 1%
3 cc. amylase 1%
3 cc. amylase 1%
Titer after treatment: 220 units

*The same dog was operated on after a few days. The pancreas showed no pathologic alterations; there was chronic perisplenitis, which probably had nothing to do with the recent treatment.

Dog 2 (Large)
Titer before treatment, 3,583 units
Treatment: Daily injections of amylase
4 cc. amylase 0.2%
3 cc. amylase 0.5%
3 cc. amylase 0.5%
3 cc. amylase 1%
3 cc. amylase 1%
3 cc. amylase 1%
Titer after treatment: 2,608 units

Dog 3 (Medium-Sized)
Titer before treatment: 586 units
Treatment: Daily injections of amylase
3 cc. amylase 0.05%
3 cc. amylase 0.2%
3 cc. amylase 0.5%
3 cc. amylase 0.5%
3 cc. amylase 1%
3 cc. amylase 1%
3 cc. amylase 5%
Titer after treatment: 253 units
Titer one week after end of treatments: 106 units

abscess at the site of injection.

We avoided intramuscular injection in order to prevent any reaction between muscular glycogen and amylase; in a similar way, we avoided intravenous injection in order to protract the action of amylase. We chose the subcutaneous method of administration.

In our 3 dogs, titration after treatment showed a strong *diminution* of amylase activity in the blood serum (see table). In the third dog a control titration a week after the end of the treatment showed a further diminution of the amylase level.

We have now begun a new order of studies on the level of amylase in the pancreatic juice during treatment with a solution of amylase injected subcutaneously. Instead of preparing a pancreatic fistula according to Abderhalden, we decided to take the total duodenal juice, since the duodenal amylase, as far as is known, is entirely of pancreatic origin. After having performed gastroenterostomy to keep the dog alive as long as possible, we introduced into the duodenum a T-tube of the Kerr type, the long branch of which ended in a glass vial in which the duodenal juice was collected. The amylase level in the duodenal juice was also found to drop after treatment with amylase injections. Our further results will be recorded in a later publication.

CONCLUSIONS

Our researches in the field of acute hemorrhagic pancreatitis, with the goal of explaining the high titer of amylase in the blood serum associated with this condition, have brought to light for the first time the experimental production in dogs of a demonstrable antiamylase. In other words, amylase can be produced, as we have demonstrated, just as other workers have demonstrated the production of antitrypsin and antilipase, we have demonstrated that in the experimental animal, after appropriate sensitization, an antiamylase factor inhibiting blood serum amylase.

This result is the basis of the following conclusions:

1. The increase of amylase and, perhaps, of other pancreatic enzymes in the presence of acute pancreatitis and other pathologic conditions may be explained not by rupture of pancreatic acini but by a disturbed equilibrium between enzymes and antienzymes. As demonstrated by Radakovitch, Pearse and Strain, the enzymes in the blood serum may occur in the absence of high level of the typical lesions of pancreatic tissue. Others also have stated that increase of blood serum enzymes may be due to their being freed from the ruptured pancreatic acini. Our researches lead us, therefore, to the hypothesis that a higher or lower blood

serum level of enzymes may be due to an imbalance between enzymes and antienzymes.

2. The immunizing action of amylase persists for some time. Our researches showed that in the experimental dog one week after treatment the blood serum amylase titer was still lower than the previous one, demonstrated that the antiamylase factor persists for at least a week after sensitization. In fact, we are of the opinion that it should persist much longer, and studies on this point, an important one from the clinical point of view, are in progress.

Our first observations will be continued, with further research into the physiopathologic character of the pancreas. The comparison of our results with those of other investigators should prove interesting.

SUMMARY

The authors have shown that in dogs treated with amylase the enzyme titer in the blood serum dropped considerably. They have demonstrated the existence of an anti-amylasic factor. This research is original, and the results are here described for the first time in the literature.

RIASSUNTO

Gli autori hanno dimostrato che nei cani trattati con amilasi il tasso dell'enzima nel sangue cade considerevolmente. Essi hanno dimostrato l'esistenza di un fattore anti-amilasi.

La ricerca è originale e questi sono i primi risultati apparsi nella letteratura.

SUMÁRIO

Os autôres demonstram que a taxa de enzimas no sôro sanguineo cái consideravelmente em experimentações feitas em cães tratados pela amilase. Demonstram êles a existencia de um fatôr anti-amilásico. Afirmam sêr a sua pesquiza absolutamente original, sendo os seus resultados, pela primeira vez, registrados na literatura médica mundial.

RÉSUMÉ

Les auteurs rapportent que le titrage de l'enzyme dans le sérum baisse beaucoup si des chiens sont traités à l'amylase. Ils ont prouvé la présence d'un facteur antiamylase. C'est un travail original et unique.

ZUSAMMENFASSUNG

Die Verfasser haben festgestellt, dass der Enzymtiter im Blutserum von mit Amylase behandelten Hunden erheblich sinkt und haben das Bestehen eines Antiamylasefaktors nachgewiesen. Es handelt sich um eine Originalforschung, deren hier niedergelegte Ergebnisse zum ersten Mal in der Literatur erscheinen.

RESUMEN

Los autores han demostrado que en perros tratados com amilasa, la titulación enzimática sanguínea desciende considerablemente. Ellos han demostrado la existencia de un factor antiamilasa. Esta investigación es original y los resultados se describen aquí por primera vez en la literatura.

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Announcement

International Section of Occupational Surgery

The Executive Council of the United States Section and the Board of Trustees of the International College of Surgeons have unanimously approved the formation of an International Section of Occupational Surgery, the aims of which are (*a*) elevation of standards for the practice of occupational surgery, (*b*) conservation of the health of the worker after occupational injury, (*c*) official recognition of this specialty, (*d*) stimulation of interest in this field by students and members of the profession, and (*e*) cooperation in the establishment of facilities for graduate education in occupational surgery by means of residencies in hospitals affiliated with medical schools, or their equivalents.

For further details, address Dr. Chester Guy, Secretary, United States Chapter, International College of Surgeons, 1516 Lake Shore Drive, Chicago 10, Illinois.

Early Diagnosis and Treatment of Carcinoma of the Cervix

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MARSHFIELD, WISCONSIN

FOR some time the medical profession has sought to educate the layman into a "cancer-conscious" state of mind. It has utilized every potential medium at hand to publicize its theory that much of the responsibility for cancer detection rests with the individual patient. It has ardently campaigned over the radio, in the newspapers and in current periodicals, stressing the need of personal vigilance, prescribing frequent checkups, bemoaning procrastination, and emphasizing the danger of lumps and lesions. Relentlessly and with unmitigated realism it has warned the public at large to be on the watch for "signs and symptoms."

Has it been carried away by its own enthusiasm? Has it allowed itself to become so absorbed by its contention that cancer detection is paramount, that it has allowed the cancer prevention to become subordinated to it? By its self-imposed proclivity to "await symptoms," has it inadvertently by-passed recognition of its own responsibility in the detection of cancer potentialities? It does appear that in its exuberance to educate the public, it has overlooked the all-important time element as regards cancer of the cervix, and the fact that these so-called lumps and lesions are lethal manifestations. When "signs and symptoms" of cancer of the cervix come to the attention of the patient, it is often too late.

On this basis, it is my sincere belief that every female patient over 20 years of age who enters a doctor's office for any reason whatsoever should be examined for cancer of the cervix. If this were done, early detection of carcinoma would no longer be a rarity; the development of many cancers would be retarded in their incipiency.

It has been my experience that the female patient is most receptive to the suggestion of a Papanicolaou or vaginal smear as a precautionary measure. This should be followed by a cervical biopsy or curettage if there is any basis whatsoever for suspicion. The cervix is an organ that can be easily palpated; its very accessibility should encourage prophylaxis. It is no secret that cervicitis, acute or chronic, is a fertile field for the development of cancer. Early detection is possible only if routine use is made of the microscope and the laboratory. With cancer of the cervix the time element is paramount, and the chances for complete cure depend upon early diagnosis.

A review of 3,000 vaginal smears reveals that frequently a perfectly normal-appearing cervix, when a biopsy is performed, shows a clear-cut microscopic picture of malignant disease. Observation of the cervix may reveal a small leukoplakic spot or a small polyp at the external os, deceptively simulating a benign growth. The os is a particularly vulnerable spot for the origin of cancer. Occasionally, carcinomas grow into the glandular lumens of the bartholin cysts and may appear as small, very hard areas covered with perfectly normal-appearing epithelium. These areas should be probed. If they are degenerative, they will break through and divulge an undermining carcinomatous growth.

Any cervix that shows resistance to healing or presents a questionable atypical epithelial picture merits repeated micro-

From the Marshfield Clinic.
Read at the Eighth International Congress of the International College of Surgeons, Madrid, Spain, May 1952.
Submitted for publication June 16, 1952.

scopic tests. In just such an instance I did 5 biopsies at monthly periods on 1 patient. All 5 defied diagnosis. With the sixth, I established the presence of malignant change. Apprehension and perseverance in this case were justified, because granulation appeared at the vaginal cervical junction and, in spite of douching, showed not the slightest inclination to heal.

Tissue removed for biopsy should be of generous proportions to facilitate laboratory procedure. It is my opinion that the best specimens are obtained by "coning" the cervix with the radio knife, since the complete cervical canal at the external os can then be neatly removed and several blocks made for microscopic examination. The technic should be carefully developed so that charring and polarization are reduced to a minimum. The pathologist is definitely handicapped by any extensive coagulation of the epithelium of the specimen.

If it is determined that cancer is present, that it is operable, and that a total hysterectomy is in the cards, then the intermittent rest period of three or four weeks necessary for complete healing of the cervix should be taken up with irradiation, the forerunner of surgical intervention.

Any qualified surgeon can make a microscopic diagnosis of advanced carcinoma of the cervix, but it takes a pathologist skilled in microscopic technic to diagnose a very early cervical cancer. This procedure is so difficult that not infrequently pathologists trained in gynecology often take issue with each other as to what actually constitutes malignancy. Confusion in the laboratory is a real hazard for the surgeon, who must correlate the minimal histologic evidence with the microscopic

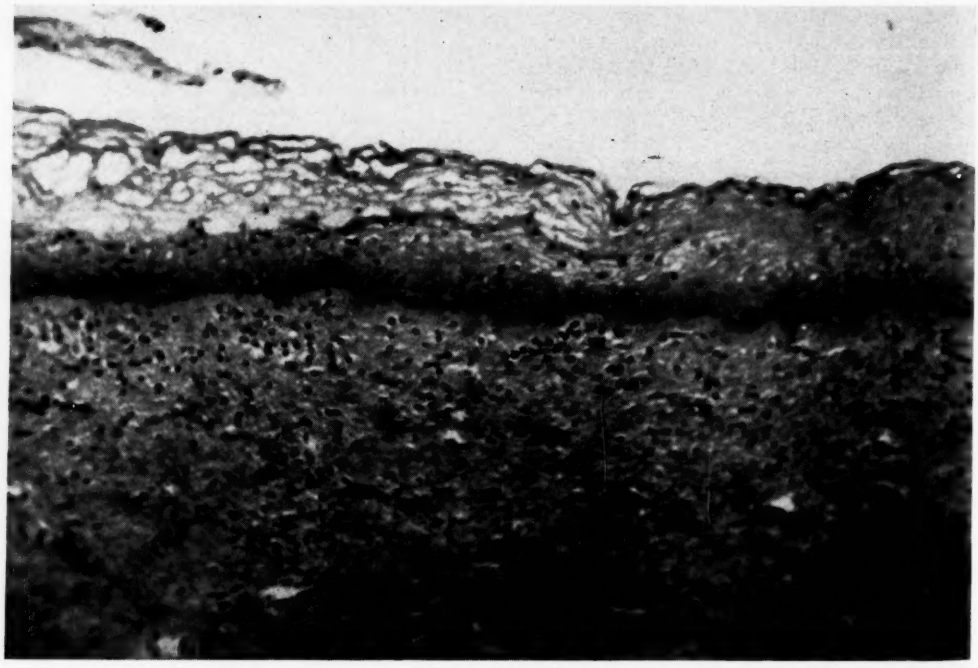

Fig. 1.—Cervical epithelium. In the normal cervical epithelium the basal cell layer in characterized by oval cells, typically darker-staining than those lying directly above. The adjacent cells become progressively flatter and paler as they approach the surface.

Fig. 2.—Photomicrograph showing normal stratification of the cervical epithelium. Almost always a horizontal line of demarcation is located at one-third to one-half the thickness of the epithelium.

observations.

As a matter of fact, just such dissension has accrued as a result of efforts to catalogue noninvasive lesions. They have been mistakenly labeled noninvasive cervical carcinoma, carcinoma *in situ*, and even Bowen's disease of the cervix. Actually when changes in the individual cells of the surface epithelium are evident, it is safe to assume that there is adequate support for a diagnosis of malignant disease.

It should be noted here that cell changes in the surface epithelium, which not infrequently extend in a thin layer over the adjacent tissue, closely simulate those same changes deep within the main growth. Surgeons would do well to be ever mindful that these superficial cellular changes are indicative of a preinvasive stage of carcinoma. As successful treatment is dependent upon early treatment, there is no justification whatsoever for ignoring laboratory proof of cellular changes in a biopsy specimen. Once a typical surface lesion has been identified, cancerous manifestations are surely a potential to be reckoned with.

Many specific cases have been cited in the literature to substantiate the premise that as many as eight or nine years may elapse between the time when microscopic intra-epithelial changes are recognized and the time when actual invasive gross carcinoma is apparent to the physician. It is important to remember that "symptoms" suggestive of malignant tumor of the cervix may well be completely absent. On the basis of innumerable observations, it is safe to say that the average age for the development of surface epithelial changes may be as early as 36—approximately ten years before the recognized

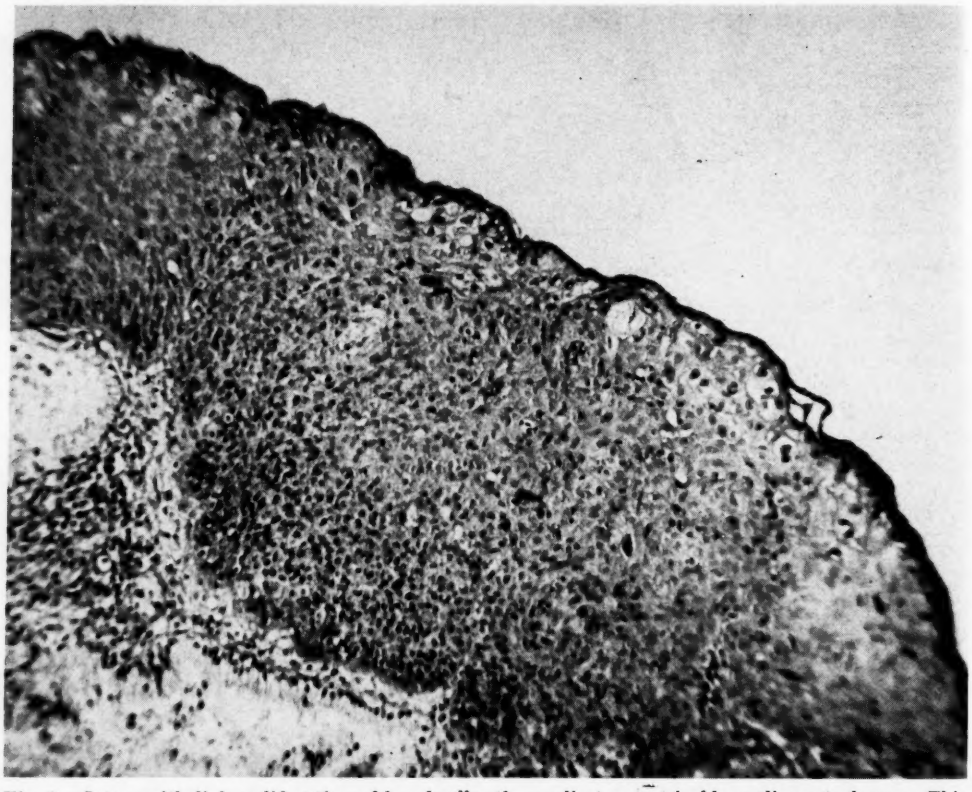

Fig. 3.—Intra-epithelial proliferation of basal cells, the earliest recognizable malignant change. This proliferation thickens the basilar portion of the epithelium and causes elevation of the line of demarcation described (Fig. 1). With continued proliferation of the basal cells, the full thickness of the surface epithelium is reached and the normal stratification of the epithelial cells is lost.

average age for true invasive carcinomatous lesions.

It is my conviction that a surgeon should never by-pass a suspicious case, but rather perform repeated biopsies at intervals of a month or so until he is well satisfied that malignant change is not imminent. Only a very negligible number of cases, in which there were typical surface epithelial changes, have failed to yield a positive diagnosis of malignant disease in the gross cervix removed at some time or other. This possibility of delayed reaction can best be emphasized by using the examples recorded in literature by Stevenson and Scipiades. In 1 case, typical intra-epithelial changes were observed in a piece of tissue removed in performing a trachelorraphy in 1919. Two years after this the cervix of this patient appeared normal on speculum examination. More than ten years later, the patient was found to have a large cauliflower-like carcinoma of the cervix. Another case in point was that of a biopsy specimen taken from the external os in July 1934. Typical intra-epithelial changes were apparent, but the patient refused treatment. Three years later, when the patient died of pernicious anemia, the cervix was obtained and examined. Although this patient had never had symptoms suggestive of malignant

disease, definite invasive carcinoma was observable at several places in the cervix, the entire surface being covered with non-invasive carcinomatous epithelium. Therefore, I repeat, a lesion in the surface epithelium may exist for years before actual invasive carcinoma develops. Furthermore, a complete lack of symptoms may blind the patient and the physician to the existence of this deadly potential until it is too late.

So it is that the surgeon has a responsibility of tremendous magnitude—"cancer prevention." It is his duty to suggest a vaginal smear, or a biopsy if called for, to each and every female patient who, at the age of 20 or over, crosses his threshold.

Now, I should like to review for you the histopathology of cervical "carcinoma *in situ*." In the normal cervical epithelium, the basal cell layer is characterized by oval cells, which are typically darker-staining than those lying directly above. The adjacent cells become progressively flatter and paler as they approach the surface. By a special staining technic, these cells are found to contain increased amounts of keratin in proportion to their relative approach to the surface. This picture is described as normal cellular stratification of the cervical epithelium. Almost always a horizontal line of demarcation is seen at one-third to one-half of the thickness of the epithelium.

Now the earliest recognizable malignant change is characterized by intra-epithelial proliferation of the basal cells.

This proliferation thickens the basilar portion of the epithelium and causes elevation of the aforedescribed line of de-

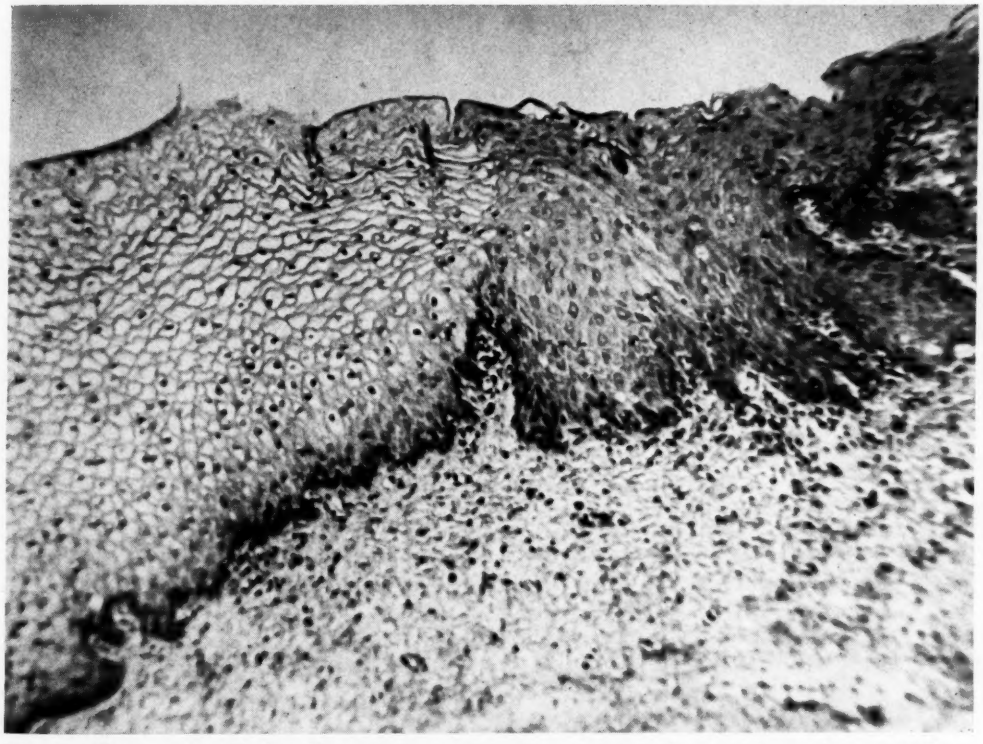

Fig. 4.—Sharp perpendicular line of demarcation between normal cervical stratified epithelium (left) and intra-epitheliar proliferation of basal cells, with beginning loss of stratification (right).

marcation. With continued proliferation of the basal cells, the full thickness of the surface epithelium is accomplished and the normal stratification of the cells of the epithelium is lost. Where this change is localized, an oblique line is formed rather than a horizontal line (oblique line of Schiller). This change may take place in a variety of ways, but the end result is always the same. There is complete loss of normal stratification of the cells. Although the earliest changes show little cytologic difference, later some pleomorphism and hyperchromasia are noted, with variable but few mitotic figures.

The next step in growth, or rather expansion of carcinoma *in situ*, is downward. When the full thickness of the surface epithelium has been involved, the growth continues into the lumens of the cervical glands. When the glands are filled to their length and breadth, the growth breaks through into the adjacent structure as direct extension. A favorite route of invasion is along the side of the cervical glands. When the cellular proliferation breaks through the basement membrane or through the limits of the invaded glands, then invasive carcinoma has occurred. This line of procedure in the development of carcinoma of the cervix has been observed so frequently, it is logical to assume that it is the inevitable histopathologic sequence of events.

At present it is the general opinion in our group that total hysterectomy is the treatment of choice for cervical carcinoma *in situ*. However, we feel that some irradiation is indicated before total hysterectomy, the amount to be determined by the microscopic picture and the extent of the invasion of the carcinoma into the glands.

The dose of irradiation to the cervix varies from 3,000 to 5,000 hours. The total hysterectomy does not include the ovaries, but does include about 1 to 2 cm. of parametrial tissue on each side of the

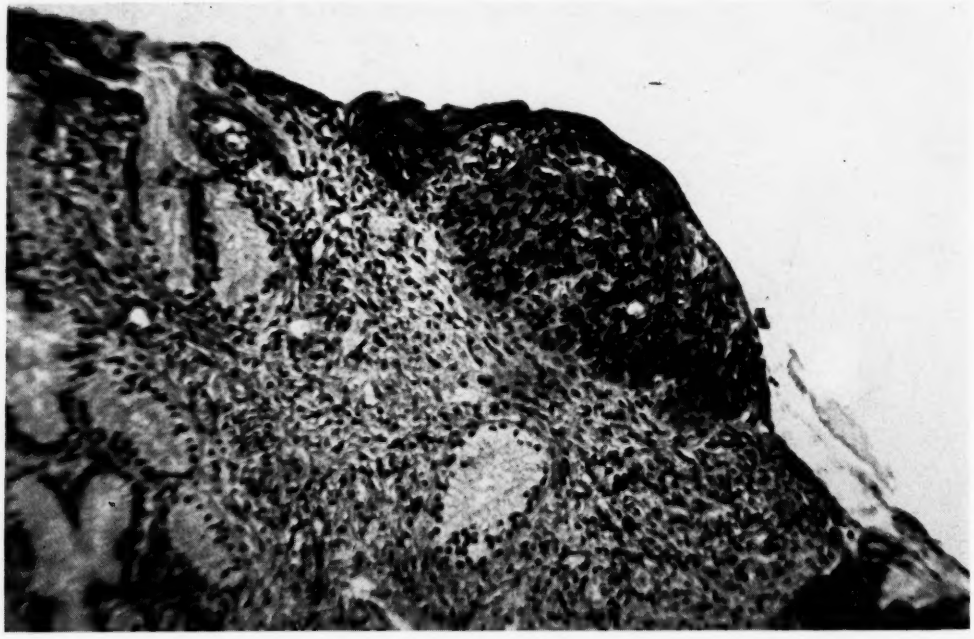

Fig. 5.—Isolated patch of carcinoma *in situ*. Note complete loss of stratification.

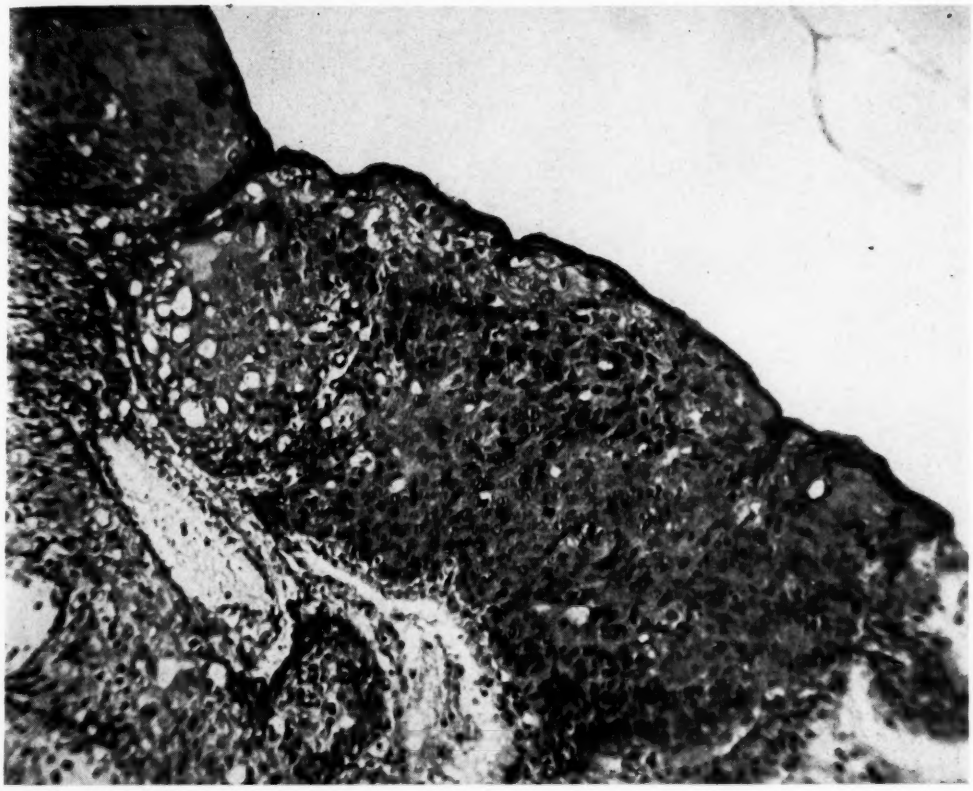

Fig. 6.—Photomicrograph illustrative of the fact that when the full thickness of the surface epithelium is reached by the growth of carcinoma *in situ*, the next step in expansion is downward.

uterus, plus a small margin of the vaginal cuff. The patient is always prepared by the insertion of a catheter into each ureter to guide the surgeon during the technical surgical removal of the complete uterus, so that no injury may befall the bladder or ureters.

CONCLUSIONS

In the 3,000 routine studies made of vaginal smears taken from all patients over 20 years of age entering the Marshfield Clinic, Marshfield, Wisconsin, 1.3 per cent have shown carcinomas *in situ*. The age incidence ranged between 20 and 74 years, the average age being 40. These figures correspond to the statistics offered by other investigators and serve to support the author's contention that carcinoma *in situ* occurs in women whose average age is 10 years less than those with clinically obvious invasive carcinoma of the cervix. Here we have, then, a definite latent period. This is the time in which it is possible to study each case thoroughly and make certain of the diagnosis by repeated biopsy studies. Some cancers of the cervix grow faster and more furiously than others, and this is also true of cervical carcinoma *in situ*. With this latent period in mind, one can make a careful study of biopsy material taken at six-week to two-month intervals until one is convinced that the diagnosis is correct and the case thoroughly evaluated, and so

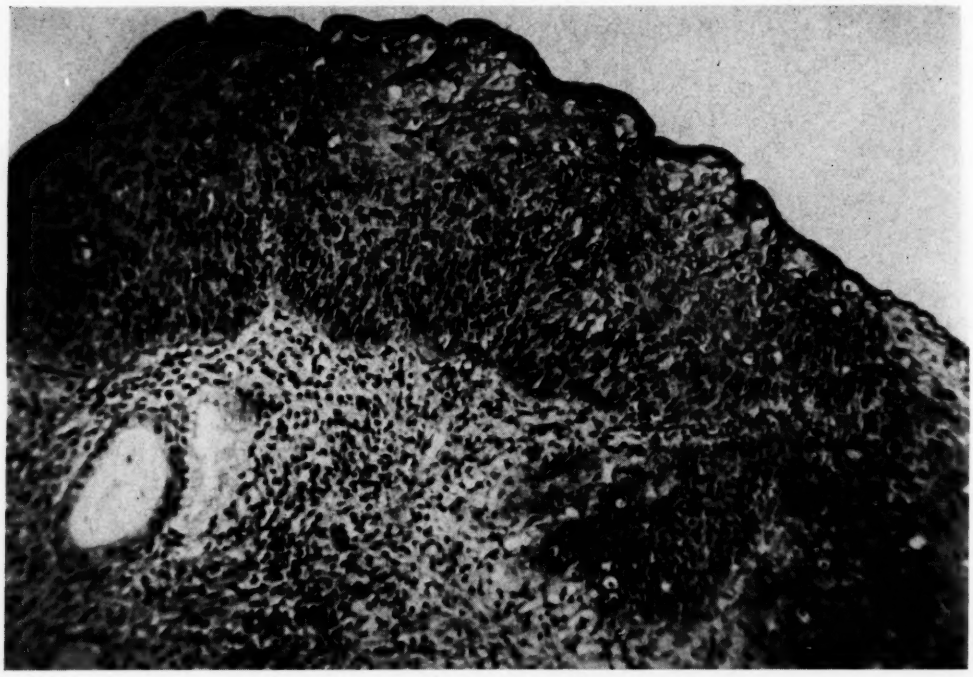

Fig. 7.—Photomicrograph illustrative of the fact that when the full thickness of the surface epithelium is reached by the growth of carcinoma *in situ*, the next step in expansion is downward.

decide on the proper therapeutic procedure. It is of the utmost importance that an accurate interpretation of the cellular structure be made by a well-trained pathologist, and equally important that the point at which the biopsy material is taken be chosen with care. The juncture of the two cervical epitheliums should be present in the biopsy specimen, as this is the point at which most cancers begin.

What is the solution to this problem? How can physicians detect carcinoma of the cervix while it is in an easily curable stage as carcinoma *in situ*? First, in the case of every female patient who comes to you for examination, regardless of the complaint, a vaginal smear should be taken, a full view inspection of the cervix made, and, if desired, a Schiller test. If If the results of these investigations are negative, there is no need to worry for another year. However, I should warn the patient that a clean bill of health at this time is no assurance for the future and that another thorough examination is indicated again in one year. Should the Schiller test give a positive result or the vaginal smear be positive for atypical cells, biopsy specimens should be taken at various points of the cervix, especially at the juncture of the stratified squamous epithelium with the columnar epithelium of the external os. Biopsies and vaginal smears should be repeated at monthly periods until the diagnosis is established one way or another. Certainly one should be ever watchful in any case in which a vaginal smear gives positive results, as carcinoma has been reported in 95 per cent of such cases. In the author's experience, in all cases in which carcinoma has been proved, the vaginal smear has given positive results.

Biopsy, biopsy and more biopsy—for

biopsy is the thing, and in biopsy we have the only method of diagnosing carcinoma at a stage when it is almost 100 per cent curable.

RÉSUMÉ

Des 3000 prélèvements vaginaux examinés à la Marshfield Clinique, Marshfield, Wisconsin, et prélevés sur des patientes de plus de 20 ans, 1.3% présentent du cancer "in situ". L'âge varie de 20 à 74 ans; la moyenne étant de 40 ans. L'auteur ensuite considère les âges, le mode d'extension, la nécessité de faire des prélèvements en série afin de pouvoir aplliquer la thérapeutique indiquée le plus tôt.

L'auteur aussi, insiste pour que le médecin fasse un diagnostic précoce de la maladie par un examen méthodique du col utérin. Il insiste sur la nécessité de répéter les tests et de les faire examiner par des pathologistes d'expérience Seulement, pourrait-on alors déceler le cancer dans 100% des cas.

RESUMEN

El frote vaginal efectuado en pacientes de más de 20 años en 3,000 estudios de rutina, demostró 1.3% de carcinomas in

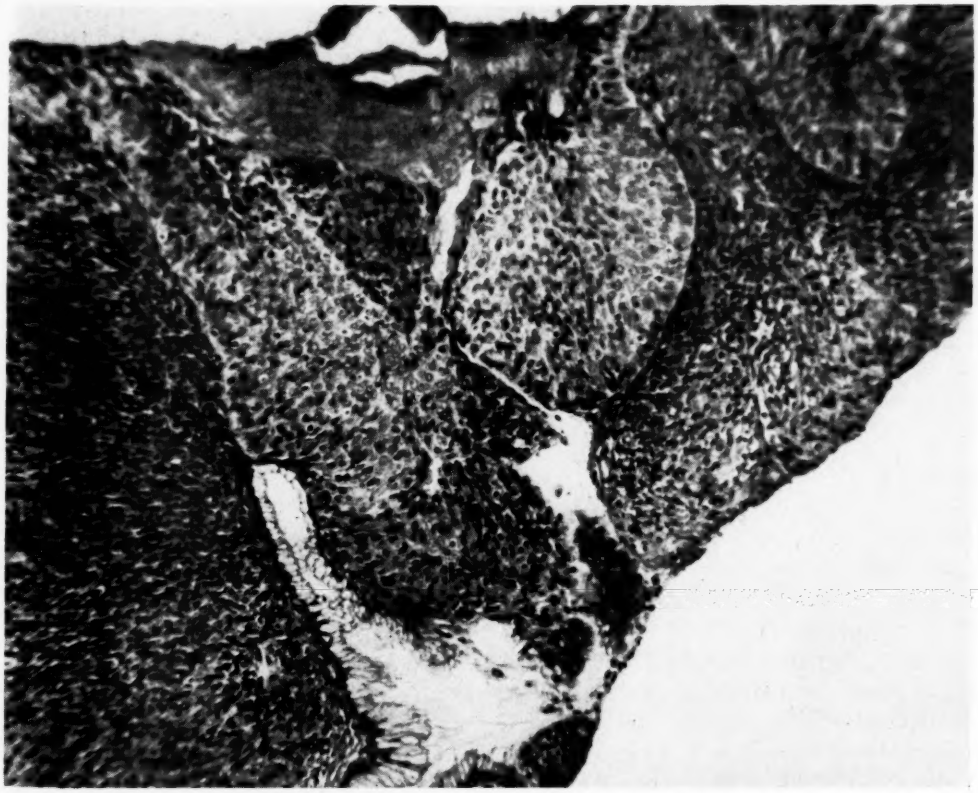

Fig. 8.—Photomicrograph indicating a favorite route of invasion alongside the cervical glands. When cellular proliferation breaks through the basement membrane or through the limits of the invaded glands, invasive carcinoma is present.

situ. Se trató de mujeres de 20 a 74 años de edad, con promedio de 40. De conformidad con otros autores, se opina que el carcinoma in situ ocurre en mujeres cuyo promedio de edad es 10 años menos que aquellas con carcinoma cérvicouterino invasor clínicamente evidente. Existe entonces un período latente definido, en que es posible obtener el diagnóstico por estudios de biopsia repetidos, con intervalos de seis semanas a dos meses, hasta el diagnóstico correcto y la terapéutica apropriada. Debe disponerse de una biopsia bien hecha y de un anatomopatólogo calificado.

En la solución del problema planteado, los médicos deberán, en el caso de cada paciente que recurre al examen, tomar un frote vaginal, hacer una inscompleta cervical y si así se desea una prueba de Schiller. Repetir esto anualmente en caso negativo. Para resultados positivos con la prueba de Schiller o el frote vaginal (células atípicas), deben tomarse las muestras de la biopsia en diversos puntos cervicales, especialmente en el límite del epitelio ecamoso estratificado con el epitelio columnar del orificio externo. Deben repetirse estos exámenes mensualmente, hasta que el diagnóstico tenga lugar de una u otra manera. Se debe ser cuidadoso en caso de resultados positivos, dado que el carcinoma se ha comunicado en el 95% de dichos casos. En la experiencia del autor se valoran los resultados en el 100%. Se insiste en la conducta mencionada, como el único método para diagnosticar el carcinoma en un período en que es curable casi el 100%, según el autor.

CONCLUSIONI

Su 3000 strisci vaginali provenienti da qualunque malata al di sopra dei 20 anni di età che si presentasse alla Clinica Marshfield (Wisconsin), 1'1,3% dimostrò carcinoma "in situ".

L'età variò dai 20 ai 74 anni con media a 40 anni. Queste cifre corrispondono alle statistiche fornite da altri ricercatori e servono di base all'opinione dell'autore che il carcinoma "in situ" si verifica in donne la cui età media è 10 anni inferiore a quelle con carcinoma infiltrante del collo, clinicamente evidente.

Vi è dunque, certamente, un periodo di latenza; in questo periodo è possibile studiare ogni caso completamente e giungere alla diagnosi sicura mediante ripetute biopsie. Alcuni cancri della cervice si sviluppano rapidamente e più vivacemente di altri, e ciò si verifica anche nel carcinoma cervicale "in situ". Avendo presente questo periodo di latenza è possibile condurre un accurato studio sul materiale bioptico preso a intervalli da 6 settimane a 2 mesi fino a convincersi che la diagnosi è corretta e il caso completamente valutato e a decidere sul mezzo terapeuticao più adatto. E' della maggior importanza che una accurata interpretazione delle strutture cellulari venga fatta da un anatomo-patologo esperto, ed è pure importante che venga scelta con cura la sede del prelievo del materiale bioptico. Il punto di passaggio dei due epiteli cervicali deve essere presente nel campione, dacchè è in questo punto che comincia la maggior parte dei cancri.

Qual'è la soluzione di questo problema? Come può un medico svelare un carcinoma del collo finchè esso si trova allo stadio facilmente curabile di carcinoma in "situ"? Prima di tutto, in ogni caso di donna che si presenti, senza distinzione per i disturbi che accusa, si deve prendere uno striscio vaginale, si deve eseguire una ispezione completa della cervice e, se necessario, il test di Schiller. Qualora il risultato di queste ricerche sia negativo non vi è più da preoccuparsi per un altro anno. Tuttavia io ammonisco la paziente che un certificato di buona salute, in quel momento, non è garanzia per il futuro e che un altro esame completo è necessario lo anno successivo. Se poi il test di Schiller è positivo e gli strisci vaginali contengono cellule atipiche, allora si devono eseguire biopsie nei vari punti della cervice, specialmente al passaggio fra lo epitelio pavimentoso stratificato e l'epitelio cilin-

drico dell'orificio esterno. Biopsie e strisci vaginali devono essere ripetuti mensilmente fino a che non si sia fatta la diagnosi, in un senso o nell'altro. Certo si dovrebbe essere sempre oculati in ogni caso di striscio positivo, poichè nel 95% di tali casi si è riscontrato un carcinoma. Nell'esperienza dell'autore tutti i casi in cui fu dimostrato un cancro avevano strisci vaginali positivi.

Biopsia, biopsia e ancora biopsia—questo è il solo metodo per la diagnosi di carcinoma a uno stadio in cui esso è curabile in quasi il 100% dei casi.

CONCLUSOES

Em 3.000 estudos de rotina feitos sobre esfregacos vaginais obtidos de todas as pacientes acima de 20 anos que entrarem na Marshfield Clinic, Marshfield, Wisconsin, 1.3 por cento mostraram carcinoma *in situ*. A incidencia de idade variou entre 20 e 74 anos, a media sendo de 40. Estes numeros correspondem as estatisticas oferecidas por outros investigadores e servem como base a tese do autor de que o carcinoma in situ occorre em mulheres cuja media idade é de 10 anos menos do que aquelas com carcinoma obvio invasivo da cervix. Aqui temos, pois, um periodo latente definido. Esta é a oportunidade em que é possivel estudar cada caso minuciosamente e tornar-se certo do diagnostico por repetidos estudos de biopsia. Alguns canceres da cervix crecem mais rapidamente e mais furiosamente do que outros e isto é tambem verdade quanto ao carcinoma cervical *in situ*. Com este latente periodo em vista, pode fazer um cuidadoso estudo de biopsia tomados a intervalos de seis semanas a dois mezes até que nos convençamos de que o diagnostico é correcto e que o caso esta todo avaliado, decidindo-se então sobre o processo terapeutico adequado.

E da mais alta importancia que uma interpretação acurada da estrutura celular seja feita por um patologista bem treinado e egualmente importante que o ponto do qual a biopsia é retirada seja escolhido com cuidado. A união dos dois epitelios cervicais deve estar presente no especimen da biopsia, pois é neste ponto que a maioria dos canceres começa.

Qual é então a solução para este problema? Como poderão os medicos diagnosticar o carcinoma da cervix emquanto no estado facilmente curavel de carcinoma *in situ?* Primeiro, em cada paciente feminina que venha a exame, desdeixando-se a queixa, um esfregaço vaginal deve ser tomado, uma inteira inspeçao da cervix feita e, si desejavel, um teste de Schiller. Si os resultados dessas investigações forem negativos, não ha necessidade de preocupações por um outro ano. Eu aconselharia, contudo a paciente de que o certificado de saude a este tempo não é segurança para o futuro e de que outro exame completo é indicado de novo dentro de um ano. Caso o test de Schiller de um resultado positivo ou o esfregaço vaginal seja positivo para celular atipicas, especimens devem ser tomados em varios pontas da cervix, especialmente na junção do epitelio excamoso estratificado com o epitelio colunar do oreficio externo da cervix. Biopsias e esfregaços vaginais devem ser repetidos em periodos mensais até que o diagnostico seja estabelecido de um modo ou de outro. Com toda a certeza dever-se-a estar vigilante em todos os cases em que um esfregaço vaginal der resultados positivos, pois o carcinoma tem sido reconhecido em 95 por cento de tais casos. Na experiencia do autor, em todos os casos que o carcinoma tem sido provado, o esfregaço vaginal tem dado resultados positivos. Biopsia, biopsia e mais biopsia, porque biopsia é a chave e na biopsia nos temos o unico metodo de diagnostico do carcinoma em um estagio em que é mais ou manos 100 por cento curavel.

ZUSAMMENFASSUNG

Unter 3000 routinemaessigen Untersuchungen des Scheidensekrets, die an allen ueber 20-jaehrigen die Marshfield-Clinic in Marshfield, Wisconsin, aufsu-

chenden Patientinnen vorgenommen wurden, fanden sich 1, 3% Karzinome *in situ*. Das Alter der Kranken schwankte zwischen 20 und 74 Jahren und war im Durchschnitt 40 Jahre. Diese Zahlem stimmen mit den Statistiken anderer Untersucher ueberein und bekraeftigen die Behauptung des Verfassers, dass das Karzinom *in situ* bei Frauen vorkommt, deren Durchschnittsalter 10 Jahre weniger betraegt als das der Frauen mit klinisch erkennbaren infiltrierenden Zervixkarzinomen. Wir haben also mit einer bestimmten Latenzperiode zu tun. Dies ist die Zeit, in der die Moeglichkeit besteht, jeden einzelnen Fall sorgfaeltig zu untersuchen und die Diagnose durch wiederholte Probeexzisionen zu sichern. Manche Zervixkarzinome wachsen schneller und wilder als andere, und das trifft auch auf die Zervixkarzinome *in situ* zu. Beachtet man diese Latenzperiode, so kann man in Abstaenden von 6 bis 8 Wochen gewonnenes Exzisionsmaterial solange sorgfaeltig untersuchen, bis man sich von der Richtigkeit der Diagnose ueberzeugt und den Fall genau ausgewertet hat, sodass die geeigneten therapeutischen Massnahmen getroffen werden koennen. Es ist von aeusserster Wichtigkeit, die Zellstrukturen von einem gut ausgebildeten Pathologen sorgfaeltig interpretieren zu lassen. Nicht weniger wichtig ist es, die Stelle, an der die Probeexzision vorgenommen wird, mit Sorgfalt zu waehlen. Das Exzisionspraeparat muss die Verbindung der beiden Zervixepithelien aufweisen, weil dies die Stelle ist, an der die meisten Krebse entstehen.

Wo liegt nun die Loesung des Problems? Wie kann der Arzt ein Zervixkarzinom entdecken, solange es sich noch im leicht heilbaren Stadium des Carcinoma *in situ* befindet? Vor allem sollten an jeder Patientin, die zur Untersuchung kommt, ohne Ruecksicht auf die Art ihrer Beschwerden ein Scheidenabstrich, eine komplette Inspektion der Zervix und, nach Wunsch, eine Schillersche Probe vorgenommen werden. Sind die Ergebnisse dieser Untersuchungen negativ, so braucht man sich fuer ein weiteres Jahr keine Sorgen zu machen. Man sollte aber die Patientin darauf hinweisen, dass das zu diesem Zeitpunkt abgegebene Gesundheitszeugnis keine Garantie fuer die Zukunft bedeutet, und dass eine neue sorgfaeltige Untersuchung in einem Jahr angezeigt ist. Sollte die Schillersche Probe positiv ausfallen oder der Scheidenabstrich atypische Zellen aufweisen, muessen Probeexzisionen von verschiedenen Stellen der Zervix, besonders aber vom tenpithel und dem Saeulenepithel des aeusseren Muttermundes vorgenommen werden. Probeexzisionen und Scheidenabstriche sollten in monatlichen Abstaenden ausgefuehrt werden, bis man in der einen oder der anderen Richtung zu einer Diagnose gelangt. Unter allen Umstaenden aber muss man, wenn der Scheidenabstrich positiv ausfaellt, auf der Hut sein, da in 95% dieser Faelle Karzinome berichtet werden. Nach der Erfahrung des Verfassers ist in allen Faellen, wo ein Karzinom nachgewiesen wird, der Scheidenabstrich positiv.

Probeexzison, Probeexzision und nochmals Probeexzision! Die Probeexzision ist die einzige Methode, ein Karzinom in einem Stadium festzustellen, wo es fast hundertprozentig heilbar ist.

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Psychosurgery

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FOR the work reported in this paper I claim neither originality of thought nor originality of method. As this treatment deals with the human mind, which is greatly influenced by culture and tradition, environment and diet, religion and philosophy, my observations on patients of India may have some little value in contributing to a better understanding of the human mind as a whole.

Before dealing with the details of leukotomy, it would be interesting to study the development of this operation. It was through the pioneering work of Prof. Egaz Moniz of Lisbon, with the able collaboration of Prof. Almeida Lima, that leukotomy was first conceived, designed and executed. Its success, popularity and importance in the development of psychiatric treatment soon became obvious. I can do no better than quote Moniz as to how he came to perform prefrontal leukotomy: "It was owing to no sudden inspiration that I performed the surgical operation which I called prefrontal leukotomy.

"A great adept of the doctrines of Ramony Cajal, based on the theory of the connections of nerve cells, I often turned my attention to the origin of normal and pathologic psychic activity and its dependence on neuronal activity. The impulses pass through the neurones along the fibrils: in the synapses alterations are produced which react on many other cells.

"To the cerebral activity of normal mental life I added the derangements that make their appearance, and which had till then no anatamopathologic explanation. I was specially impressed by the fact that the mental life of some lunatics is limited to a small circle of ideas which overrule all others and keep recurring in the diseased brain and I tried to find an explanation of this fact.

"The neurones are linked chainwise and the fibrillae of the axis-cylinder do not adhere to other cells, but come into contact with each other by means of Held's bulbs, which are of various forms. The terminal organs of the fibrillae rest on the dendrites and cellular bodies without, however, penetrating them. In a normal human being this contact never becomes a permanent rigid condition.

"Starting from these anatomic facts, I arrived at the conclusion that the synapses which are found in billions of cells are the organic foundation of thought.

"Normal psychic life depends upon the good function of the synapses, and mental disorders appear as a result of synaptic derangement.

"The neurones are from the outset organic capital which never increases in the life of man, but the quantity of neuronal prolongations, fibrillae and ramifications is extremely variable. Their number varies from person to person, and is different in the ignorant and in the cultivated man. In the latter they are more abundant, and it is supposed that they show differing characteristics according to the degree of cultural development in the various areas of the brain.

"In opposition to automatic actions, these morbid ideas are deeply rooted in the synaptic complex, which regulates the motion of consciousness, stimulating it and keeping it in constant activity. All these considerations led me to the following conclusion: It is necessary to alter the synaptic adjustments and change the paths chosen by the impulses in their constant passage so as to modify the corre-

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sponding ideas and force thought into different channels.

"Induced by those reasons, after more than two years of meditation, I decided to sever the connecting fibers of the neurones in activity. Being convinced of the importance of the prefrontal lobe in mental life, I chose this region for the attempt, and it seems it was well timed. By upsetting the existing adjustments and setting in movement other fibrillosynaptic groups, I expected to be able to transform the psychic reactions and to relieve the patient thereby."

Perhaps no disease outrivals mental illness in the havoc it creates in a patient and his immediate family. Many types of mental disorder are refractory to psychiatric measures despite the progress made in recent years with such adjuvants to psychiatric treatment as the various forms of shock therapy (insulin, cardiazol and electricity).

The term "psychosurgery" denotes surgical measures performed on the anatomically intact brain for the purpose of relieving abnormal mental symptoms. It is at best a symptomatic therapy and is not a cure for any specific mental disorder.

The technic of the operation has undergone various modifications from the original operation of Moniz and Lima in 1936. The underlying concepts and the technic of prefrontal leukotomy have changed much since the bold but naive ideas of Moniz first led him to begin this work in 1935. The severance, to a greater or lesser extent, of the thalamofrontal radiation is now the object of the procedure. This is the stream of fibers that runs forward from the dorsomedial nucleus of the thalamus to the frontal poles.

Recently there has been a plethora of new psychosurgical methods. This has created considerable bewilderment both among the clinical psychiatrists, who have to decide which of the methods to choose, and among the surgeons who have to practise them.

The different operations may be divided broadly into three groups: leukotomy proper, cortical ablation and miscellaneous procedures.

Leukotomy proper, i. e., the cutting of white fibers without removing any brain matter, can be subdivided into procedures based only on external measurements—the wholly blind operation, including the orthodox leukotomy, e. g., that of Freeman and Watts, the most commonly used, and the transorbital leukotomy. Next are the open operations under visual control—the Lyerly method (1939), the method elaborated by Poppen (1948) rostral leukotomy, Scoville's method of undercutting, and others with minor modifications in the approach either from the temporal fossa or from the superior surface.

All cortical ablations must necessarily be performed by the open method. There are the total prefrontal lobectomy as recommended by Peyton (1948) and his associates, partial ablation, as in Penfield's gyrectomy (1948), and the topectomy of Heath and Pool. These operations have been modified to a minor extent by several French surgeons.

Of the miscellaneous operations the most important is thalamotomy, which was introduced by Spiegel and his associates in 1947.

Theoretical Considerations.—The frontal cortex is customarily divided into a granular and an agranular portion. The prefrontal region, or frontal association area, has been subdivided by Brodmann into Areas 8, 9, 10, 11, 12, 45, 46, 47. All these are granular, except perhaps part of Area 8. Walker recently differentiated posterior parts from the rest of the orbital region in monkeys as Areas 13 and 14. These two regions are important because, as has been shown recently, they are concerned with autonomic function, and bilateral ablation of Area 13 in monkeys leads to severe restlessness. Autonomic control seems also to be exercised by the anterior cingular region, which, though not a part of the prefrontal region, may be involved by the usual cut.

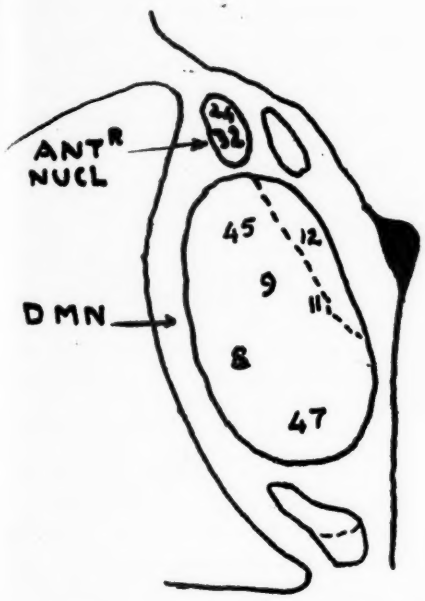

Fig. 1.—Diagrammatic representation of the dorsomedian nucleus of the optic thalmus.

The prefrontal region has many connections with other parts of the brain. Stress is laid on the important connection of the frontal lobe, first with the thalamus which relays most sensory impulses coming from the periphery, and second, through the thalamus, with the hypothalamus, which is known to be an important control station of metabolism and particularly of autonomic function. It has been suggested by Le Gros Clark that the prefrontal region is in essence the projection area of the hypothalamus. The thalamic projection to the prefrontal region arises in the dorsomedial nucleus: that to the cingular region, in the anterior nucleus. If the fibers to these projection systems are cut, retrograde degeneration ensues in the thalamic nuclei.

Though it is improbable that the frontal lobes have no importance in intellectual function, they would seem less essential in that connection than was previously thought, and attention has come to be focused more on the role they play in emotional life. This is in line with the suggestion of von Bonin that on comparative grounds it is the temperoparietal region rather than the frontal lobes that shows the greatest evolutionary development in man and is probably responsible for his intellectual ascendency.

The hypothalamus, the thalamus and the cortex are to be regarded as the component parts of a coordinated system, mutually interdependent and influencing each other. The hypothalamus appears to exert decisive influences on the body economy as a whole—on the pulse rate, the rate of respiration, the blood pressure, the blood sugar content, etc. In fact, it is hypothalamic activity that determines

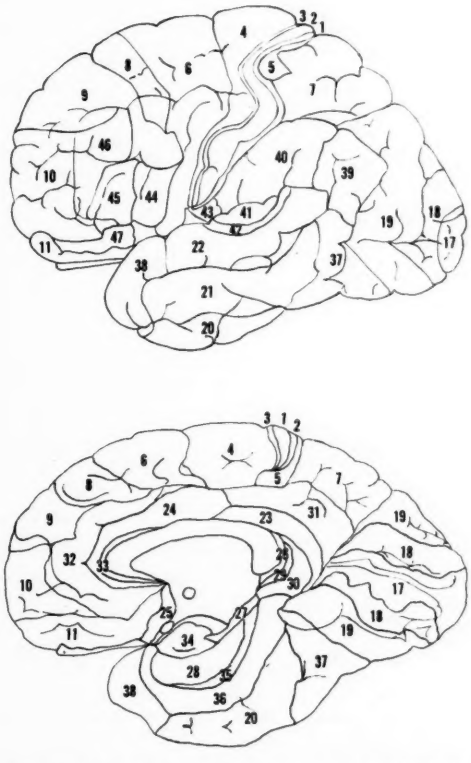

Fig. 2.—*A*, lateral view of cerebral hemisphere showing Brodmann's areas. *B*, mesial surface of cerebral hemisphere showing Brodmann's areas.

the tensions at which we live and that provides the basis with which conscious experience becomes possible.

The question arises whether prefrontal leukotomy and similar operations are specific or nonspecific. It is known that organic and emotional influences are able to alter psychotic and neurotic disorders. Intercurrent diseases have often a beneficial influence on mental sickness. Therefore it may be argued that trauma of the brain can have the same or a similar effect. If this is the case, any operation on the brain, regardless of location, ought to produce results similar to frontal leukotomy. Experience has shown that this is not so.

For example, ligation of the veins of the frontal lobes without any operation on the frontal lobe itself has produced very little improvement in the patient's condition, which proves that leukotomy cannot be replaced by 'any' operation on the brain and that it has a certain amount of 'specificity'. Further, if one assumes that the psychosurgical operations used today have some specificity, must this operation be performed on the frontal lobe? Recently some claims have been put forward that mental disorders can be influenced by operations on the temporal, occipital and parietal lobes without any operation on the frontal lobes. It is not only difficult but too early to evaluate this claim.

Spiegel introduced thalamotomy to show that operation on the frontal lobes is unnecessary and can be done effectively on the thalamus.

Some difference is observed in the results if the operation is done too anteriorly or too posteriorly. Aggressiveness is more easily released if the operation is done too anteriorly. On the other hand, the patient becomes lethargic and apathetic if it is done too far posteriorly, toward the ventricle.

From the claims and counterclaims of various operations two questions arise: 1. Are these observations qualitative, in the sense that a certain definite area in the brain has a specific function? 2. Are the operations quantitative, i. e., does a certain amount of cortex have to be removed or certain connections severed before appreciable effects can be obtained? If this is true, it should not matter where the operation is performed; the results should be the same.

It is necessary to recall that the long association fibers connecting the cortical areas of different lobes are very important. These connections within the cortical areas and with the thalamus explain why, after frontal leukotomy, the alterations of psychic function are comparatively small.

One other experience that aids in understanding the function of the frontal lobe is that in cases of bilateral prefrontal leukotomy performed for intractable pain there was no appreciable intellectual impairment. In a series of 3 patients subjected to bilateral prefrontal leukotomy for relief of intractable pain, the result of inoperable malignant disease, preoperative and postoperative psychometric measurements showed no appreciable difference. There is a certain complacency, and vivacity is reduced. The patient's anticipation of what will happen next is diminished.

Frontal leukotomy is not only an important tool in the treatment of clinical mental disorder but is a procedure of great theoretical importance.

The operative technic closely resembles that described by Freeman and Watts. The approach is by the lateral route, the burr opening being 2.5 cm. behind the anterior orbital margin and 5.5 cm. above the zygoma. A localizing plate is used to mark the exact site of operation and a 0.5 cm. opening is made with a Carr burr. After incision of the dura, the leukotome is introduced to the desired depth, and a cut is made in a plane parallel to the coronal suture. In our early cases a McGregor and Crumbie leukotome was used but after a serious mishap that occured when the instrument was in the brain it was given up in preference to an instrument devised locally. This is a bent instrument similar to Killian's nasal elevator except that the blade is hollow and the

proximal end made to fit into a syringe. This instrument can be made in any workshop and is simple in construction. The hollow shaft indicates (by the escape of cerebrospinal fluid) the passage of the instrument through the tip of the anterior horn of the lateral ventricle. In addition, it would be useful when visualization of the position and extent of the leukotomy is desired, as a small quantity of radiopaque material could be introduced into the brain with the leukotome in position.

The depth to which the leukotome is introduced is variable. In our early cases the diameter of the brain was measured with calipers; from this measurement the thickness of the white matter was estimated, and the depth from the dural surface to which the leukotome was to be introduced was calculated. In practice it was found that, in almost all cases, the depth to which the leukotome was to be introduced was in the neighborhood of 4 cm. It is not my usual practice, therefore, to measure the diameter of the brain, but to introduce the leukotome to a depth of 4 cm. from the dura. Only in exceptional cases, as when there is a deformed skull, a small cranium or an external hydrocephalus, is the diameter of the brain measured.

The McGregor and Crumbie leukotome, though it is excellent in conception and produces standard uniform cuts in the desired position, was given up because, in one operation, when the instrument was inside the brain, the mounting of the rotary blade slipped, and the instrument was withdrawn with great difficulty after much damage to the brain.

Complications after operation are met with, though not frequently. Some are transient, but a few are persistent. My experience has been fortunate, and the few complications that I have met with, such as headache, incontinence of urine and anisocoria, have been transient.

Hemorrhage after leukotomy is always a dreaded complication, and in the case of the so-called blind operation it may be uncontrollable and may even cause death. Of course, in the open types of operation it is not usual to encounter either immediate or late hemorrhage. This is decidedly an advantage, but the mortality rate of the larger operation by the open method does not offset the deaths due to hemorrhage following the closed operations. It is surprising, however, how infrequently an uncontrollable hemorrhage has occurred at operation. In a series of over 250 operations, serious hemorrhage has occurred in only 1 case.

Three typical cases are reported briefly.

REPORT OF CASES

CASE 1.—An unmarried youth aged 18 was admitted to the hospital on July 8, 1939, as a wandering lunatic. He was illiterate and had worked on a farm. Prior to the operation he showed instability and dirty habits, laughing and muttering to himself, refusing to answer questions, etc. Operation was performed on Sept. 21, 1942. (Incidentally, this was my first such operation.) Improvement was manifest in three months, and a year later the patient was able to answer questions intelligently. He was usefully employed in the occupational section of the hospital. On Dec. 21, 1944, a psychometric examination showed that his mental age was 10 years, and there was no scatter. He was discharged on Jan. 30, 1945, and a follow-up reply in 1948 stated that he was happily married and attending to his farming.

CASE 2.—A man aged 32 was admitted to the hospital as a wandering lunatic. He was emotionally unstable, with disconnected speech, dirty habits and visual hallucinations —chronically schizophrenic, with deterioration. Operation was done on Nov. 16, 1942. The patient's condition was unchanged. He is still an inmate of the hospital.

CASE 3.—A married woman aged 30, with 2 children, had a mental disorder of ten years' duration. She showed hostility toward her husband, emotional disconnections, morbid preoccupation, and enuresis. Operation was performed on March 26, 1943, and in a short time she improved so much that she was discharged. She made a very good social adjustment. Some retrogression in her condition was noted in 1946, after a childbirth, and reoperation was performed on June 10 of that year. Before the second operation her mental age was 8, with wide scatter from 5 to 12 years. After operation her

mental age was still 8 years, but with no scatter. In 1949 the follow-up report stated that she was "looking after her husband and children and the household." Now and then she sits with a vacant smile and does not answer questions properly.

At the International Conference of Psychosurgery held in Lisbon in 1948, figures from different countries were compared, and the uniformity of results was surprising. My own, based on observation of over 350 cases during the course of six years (up to 1948) were not much different, and in general it may be stated that approximately one-third of my patients became socially well adjusted, one-third were relieved, and the remainder showed no improvement.

Fortunately I have encountered no immediate mortality thus far, but published results of the closed operations show a mortality rate of 1 to 2 per cent.

In the proper selection of patients for this therapy a great deal of divergence and confusion exists. Some workers in America have treated diverse conditions, both acute and chronic, by leukotomy; others are more conservative, performing leukotomy only for intractable conditions. My selection of cases has been conservative. The operation is at best mutilating, a physiologic amputation of a portion of the brain, and should never be lightly undertaken, nor should it even be attempted until all less radical methods have had a fair chance. I have followed this criterion faithfully, and the results have not been discouraging.

As to selection of cases according to the nature of the illness, most of my own patients have been manic-depressive, schizophrenic or subject to affective reactions, though they included a small number of paranoid or catatonic patients and some who were mentally defective. The greatest improvement has occurred in those with affective disorders and manic-depressive conditions and to a lesser extent in schizophrenic patients. This is in accord with the observations of workers elsewhere.

What of the future of this leukotomy? Like all new ideas, when the principle of this operation was first published, it produced a considerable volume of criticism and opposition. Various arguments were brought forward to prove the futility of the operation. Gradually, however, organized hostility ceased, and today the procedure is recognized as a useful adjuvant in the treatment of mental disorders. That the operation and its rationale have not yet been supported by a complete scientific explanation does not detract from the utility of the procedure. Until the processes of mind and thought are explained in terms of physical knowledge, any scientific explanation of the results of the operation would in my opinion, be premature.

Psychosurgery has taken strange paths, totally undreamt of by the original designers of such operations. It has proved of great benefit in the relief of intractable pain due to varied causes, and sometimes in the cure of addiction to such drugs as morphia.

With the currently increased appreciation of the importance of mental processes in disease (e.g., mucous colitis, peptic ulceration, asthma, etc.), the psychosomatic approach to illness assumes great significance. In view of the tremendous emotional stresses and strains of modern civilized life, it is not surprising that a psychologic conflict is present in most illnesses. This necessitates a careful and accurate knowledge of the brain. In this complex study, leukotomy has contributed to a considerable degree toward correct understanding.

SUMMARY

The author discusses psychosurgical technics, with particular emphasis on leukotomy and the results he has obtained from this operation. Three cases are briefly reported.

ZUSAMMENFASSUNG

Der Verfasser eroertert chirurgische Techniken von Hirnoperationen an Geisteskranken unter besonderer Beruecksich-

tigung der Resektion der weissen Hirnmasse und teilt die mit dieser Operation erzielten Resultate mit. Drei Krankheitsfaelle werden kurz berichtet.

SUMARIO

O autor discute tecnicas psicho-cirurgicas com enfase particular sobre a leucotomia e sobre os resultados que ele obteve com esta operação. Tres casos são ligeiramente relatados.

RIASSUNTO

L'Autore discute le tecniche psico-chirurgiche con particolare riguardo alla leucotomia e ai risultati che lui stesso ha ottenuto da questo intervento. Riferisce in breve su tre casi.

RESUMEN

El autor discute las técnicas psicoquirúrgicas, insistiendo particularmente sobre la leucotomía y los resultados obtenidos personalimente con la misma. Se dan a conocer sucintamente tres casos.

RÉSUMÉ

L'auteur rapporte trois cas où une technique psycho-chirurgicale fut employée. Il insiste surtout sur la leukotomie avec les résultats possibles.

The Eighteenth Annual Congress

of the

United States and Canadian Sections

International College of Surgeons

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Position of the Surgeon to Left of Patient and Technic of Cholecystectomy

VITTORIO PETTINARI, F.I.C.S.*

PADUA, ITALY

IN AN editorial article which appeared in the *American Journal of Surgery,* Dr. Walter H. Gerwig Jr. has reviewed the benefits of cholecystectomy when the surgeon takes his position to the left of the patient (Fig. 1*A*). Of special interest to me was his report that many surgeons have been inclined for some time to make this their position of choice—also his survey of the reasons for their preference.

I am glad to contribute my own agreement with Dr. Gerwig, and with it I wish to point out that I was one of the first to use this method systematically. I have been using it for more than eighteen years. Today it is used routinely by many of my student interns and by Italian surgeons who have imitated my position while operating (Figs. 1 and 2).

The same technic was illustrated by me in a film presented at the Italian Congress of Surgery in 1939, and has been recorded in various surgical publications by myself and my collaborators.

I should now like to offer certain details with regard to the method:

Contrary to Dr. Gerwig, I perform the entire operation while standing on the left side, including the incision for opening the abdomen, which I enter through a median approach, and the peritonization of the hepatic bed, the latter being much more easily cared for because it is under visual control. While so doing it is sufficient for the surgeon to shift his position toward the head of the patient while beginning to close the deep structures of the abdominal parietes (Fig. 1).

Dr. Gerwig has enumerated the advantages of this position. It permits perfect visibility, renders dissection of the cystic duct as well as of the cystic artery simple, and facilitates exploration. Maneuvers on the common duct are also rendered much easier. Should gallstones be found to exist in the common duct, it is easy to introduce the left finger into the foramen of Winslow and then perform choledochotomy, lithotomy, followed by sutuering or drainage of the common duct.

Another procedure for the fixation of the cystic duct stump to the hepatic bed, which I routinely utilize—I consider it of fundamental importance and a technic to be kept in mind—is as follows:

After having placed two distal ligatures on the cystic duct, and having separated it by sectioning from the gallbladder, I thread a needle with one of the threads of the more distal ligature, these threads being kept long. The cystic duct stump is then fixed to the hepatic bed with a stitch as shown in Figure 2*A*.

This assures definite fixation of the duct, its closure is facilitated, and peritonization is rendered easier (Fig. 2*B*).

Using this technic, I perform "ideal" cholecystectomy in almost all cases—also in cases of empyema of the gallbladder and the acute forms of cholecystic disease—with the minimum inconvenience and without danger of infiltration of bile or relaxation of the ligatures (Fig. 1*B*). When gallstones are present in the common bile duct, having ascertained and assured the patency of the duct into the duodenum (intra-operative radiomanometry), I also perform cholecystolithotomy (Fig. 1*C*).

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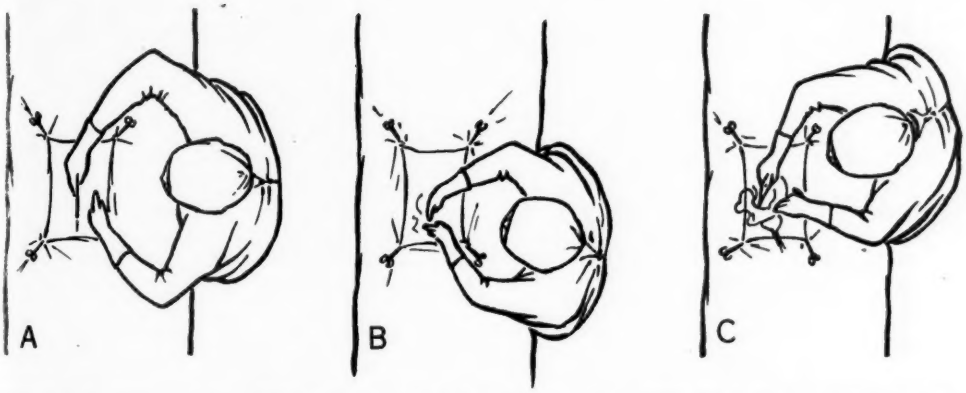

Fig. 1.—*A*, surgeon's position when opening the abdomen. *B*, slight shift in surgeon's position while caring for stump and cholecystectomy. *C*, shift toward the patient's head for peritonization.

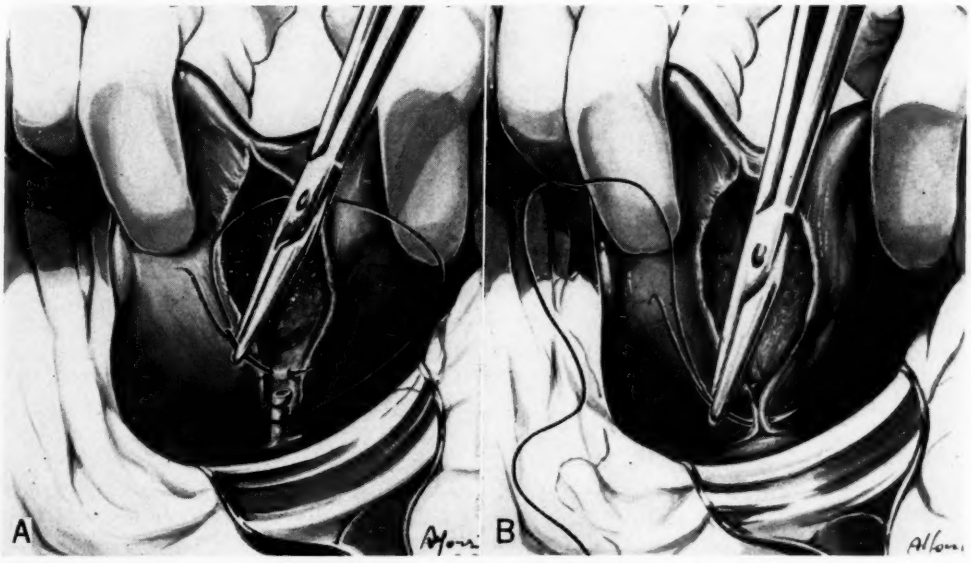

Fig. 2.—*A*, fixation of the cystic duct stump to the bed of the liver. *B*, peritonization of anatomic structures.

SUMMARY

The author describes his preferred position at the operating table (left of the patient) and explains its advantages over alernative positions.

RESUMEN

El autor describe y recomienda una posición para el cirujano en la mesa de operaciones, la cual de acuerdo a su experiencia ha demostrado ventajas facilitando la intervención operatoria.

RÉSUMÉ

L'auteur décrit et recommande une position à prendre à la table opératoire,

par le chirurgien. Cette position est avantageuse et facilite dans une large mesure la procédure chirurgale.

ZUSAMMENFASSUNG

Der Verfasser beschreibt und empfiehlt eine vom Chirurgen am Operationstisch einzunehmende Stellung. Diese hat sich in seiner Erfahrung als vorteilhaft erwiesen, da sie die Ausführung chirurgischer Mabnahmen erleichtert.

RIASSUNTO

L'autore descrive e raccommanda una posizione dal chirugo al tavolo operatorio, la quale, secondo la sua esperienza ha dato le prove di essere molto utile e di facilitare i procedimenti operatori.

The Board of Trustees
of the
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announces the creation of the

INTERNATIONAL SURGEONS' HALL OF FAME

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Rules and Regulations are now being formulated. For full details, see editorial in forthcoming January issue.

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Splanchnic Nerve Block as an Adjuvant in Intestinal Intubation

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INTESTINAL intubation, which is not only an important therapeutic procedure but a useful diagnostic aid, has made it possible an appreciable improvement in the prognosis of many abdominal diseases, especially those involving distention of a more or less long segment of the digestive apparatus. During the last four years I have regularly practiced gastric intubation for acute distention of the stomach and persistent postoperative vomiting, duodenal intubation for high obstructions and certain forms of paralytic ileus, intestinal intubation for occlusions of the ileum and of the colon, and also in many other cases. For diagnotic or therapeutic purposes. I have used Levine's tube for the stomach, Levine's tube with Einhorn's ball[2] for the duodenum, and Miller-Abbott's,[3] Cantor's[4] and Kaslow's[5] tubes for the intestine, each always introduced nasally; the results, generally very good, have already been reported.[6]

Gastrointestinal intubation is not always associated with continuous suction. Gastric intubation, and sometimes also duodenal intubation, may offer great advantages with the simple siphon method or with intermittent suction by means of a syringe. On the other hand, intestinal intubation nearly always requires continuous suction, with appropriate apparatus or a simple water pump; apart from therapeutic considerations, an easier progression of the tube is obtained in this manner.

The passage of long intestinal tubes often presents difficulties. In addition to the obstacle of mechanical obstruction, which is rarely superable when it is complete, the major difficulties are represented by (1) natural obstacles, e.g., the pyloric sphincter (or, in exceptional cases, the cardial sphincter) and the duodenojejunal flexure, and (2) certain pathologic conditions, such as gastrointestinal atony and paralytic ileus (alimentary, reflex, postoperative).

With Miller-Abbott's[3] and Johnston's[7] tubes the pylorus is an important obstacle, and various devices have been recommended from time to time,[4] in addition to use of the right decubitus position; distention of the stomach with water or with air, use of a metal stylet under fluoroscopic control, attachment of a weight to the tip of the tube, use of an electromagnet to guide the ball tip through the pylorus under fluoroscopic control, and introduction of mercury into the balloon before inflation. This last device has led to the invention of the newer recent tubes by Harris,[8] Cantor,[4] Kaslow[5] and others, in which there is a terminal bag of varying size and shape, partially filled with mercury.

I generally use Cantor's[4] tube, which has no metal parts. It has a rather small bag which—an important factor in progression—is not arranged around the distal part of the tube but is attached to the tip. Thus, as there are no limits to the free flow of the mercury, all its physical properties can be utilized: weight, mobility, cohesive power and extreme lability. The bag behaves like a bowl in every way, and the duodenum can be reached in a few hours, often with only continuous suction, the patient being in position on the right side and inclined head downward (foot of

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the bed raised 20 to 30 cm.). If difficulties arise, frequent movement of the patient is advisable. Hot water should be introduced into the stomach through the tube, and parasympatheticolytic drugs (atropine) or eventually parasympatheticomimetic drugs (neostigmine) should be injected. However, there are cases in which the passage of the pylorus, even with Cantor's or Kaslow's tube and with the various devices just mentioned, requires an exceedingly long time (twenty-four to thirty-six hours or more).

The ligament of Treitz sometimes, though much more rarely than the pylorus, constitutes a barrier against intestinal intubation, especially if the duodenojejunal flexure is extremely acute. This fact has been demonstrated also by radiologic and anatomic discoveries,[9] and in order to obviate it the left decubitus position is advised.

But it is especially the presence of gastrointestinal atony or of paralytic ileus that can slow or even stop altogether the progression of the intestinal tube; the major difficulties are encountered on the level of the natural obstacles aforementioned, and chiefly of the pylorus. Frequently, the mechanism that causes the obstruction (a typical example is postoperative ileus) leads to an orthosympathetic prevalence with simultaneous parasympathetic hypotonus; muscular paresis of the hollow organs (esophagus, stomach, intestine) results, with persistent spasm of the sphincters (cardia, pylorus). In fact, while the contractability of the walls of the gastrointestinal tract is under parasympathetic influence, the contraction of these sphincters is performed by the orthosympathetic system through the splanchnic nerves. In mechanical obstruction, moreover, the autonomic nervous system is involved, accentuating the obstruction by spasm, giving rise to zones of atony in other parts or causing intestinal hypersecretion, which aggravates the shock. Intestinal intubation in these conditions is strongly hindered, and the few devices proposed up to the time of writing[4] have little efficiency. Among these are increase of the quantity of mercury in the bag, frequent movement of the patient (not always possible) and injection of parasympatheticomimetic drugs.

For these reasons I decided to examine the possibility of facilitating and accelerating the progression of long intestinal tubes by means of blockage of the splanchnic nerves, a procedure described some time ago but only recently appreciated and spread by the work of Leriche[10] and his school. The action of this blockage on the digestive apparatus may be summarized as follows: (1) stimulation of the tone and contraction of the muscular walls of the esophagus, stomach and intestine, and (2) persistent relaxation of the cardial and the pyloric sphincters, particularly the pyloric.

The technic followed by me is the usual one, employing the posterior approach, and as it has been fully illustrated[11] it is pointless to repeat it. For obvious reasons, instead of the seated position, the lateral decubitus is preferred, on the side opposite the one intended for treatment. One per cent procaine solution without epinephrine is used (30-40 ml.), to which is added 3 mg. of d-tubocurarine chloride. Recent experimental researches[12] into the effects of the injection of curare into the carotid sinus have given me the idea of adding small doses of this drug (so-called neurovegetative doses) to the procaine solution for blockage of the autonomic nerves and ganglia.

The blockage is usually effected when, after a few hours from commencement of the intubation, the duodenum has not yet been reached; but it may also be effected earlier, a few minutes before introduction of the tube, especially in the presence of the paralytic types of intestinal occlusion. When the bag has penetrated into the duodenum, the blockage may be performed further once or twice a day, either on the right or on the left (each splanchnic nerve affects both sides of the abdomen); in exceptional cases, if there is atony or paresis

of high intensity, bilateral block is performed. As is well known, tests are available to ascertain that the splanchnic nerves have, in fact, been reached: one of these, which is very simply applied, consist of reducing the blood pressure (10 to 30 mm. of mercury); another consists in observing under the fluoroscopic screen the appearance of accentuated contractions in the gastrointestinal tract, especially at previously dilated points.

From examination of the patients treated so far (approximately 30), according to roentgenographic checks and the results obtained, it may be deduced that block of the splanchic nerves exercises a really useful action during intestinal intubation, facilitating and accelerating the progression of the tube and also influencing directly the cure of the distensive gastrointestinal diseases. No inconvenience or serious complication has ever been observed, even in cases of shock (in which, however, bilateral blockage must not be effected). This procedure, which is easily performed, is therefore devoid of risks—provided always that it is correctly carried out—and is subject to no restrictions in practical application.

SUMMARY

The passage of long intestinal tubes can often present difficulties, especially represented by obstacles of a natural kind (cardia, pylorus, duodenojejunal flexure) and certain pathologic conditions (gastrointestinal atony and paralytic ileus). Many artifices have been emphasized, generally with the aim of obtaining the passage in duodenum, some of them not simple to execute, others not free of danger and all of rather inconstant exit. The author, after stating that the autonomic nervous system is involved in distensive gastrointestinal diseases, not only of the paralytic but of the mechanical type, proposes facilitation and acceleration of the progression of intestinal tubes, especially passage of the pylorus, by means of blockage of the splanchnic nerves. The block is effected once or twice a day, with the usual technic by the posterior approach and with the patient in the lateral decubitus position. A procaine solution without epinephrine is injected, to which is added a small dose of tubocurarine. The results obtained show that this procedure is a remarkably useful adjuvant in intestinal intubation.

RESUMEN

A menudo la progreión de largas sondas intestinales presenta dificultades, especialmente representadas por obstáculos de índole natural (cárdias, píloro, ángulo duodenoyeyunal) y ciertos procesos patológicos (atonía gastrointestinal e íleo paralítico). Muchos artifícios se han emfatizado, generalmente en la puntería al obtener el paso al duodeno, algunos de ellos difíciles de realizar, otros no exentos de peligro y todos de éxito inconstante. El author, después de establecer que en las enfermedades gastrointestinales distensivas esta involucrado el sistema nervioso autónomo, no unicamente en el tipo paralítico sino en el mecánico, propone la facilitacíon y aceleracíon de la profresión de las sondas intestinales, especialmente en el paso al píloro, por medio del bloqueo del nervio esplácnico. El bloqueo es efectuado una ó dos veces al día, con la técnica usual por vía posterior y con el paciente en posición lateral. Se inyecta una solución de procaína sin epinefrina, a la que se agrega una dosis pequeña de tubocurarina. Los resultados obtenidos musetran que este procedimiento es útil cuadyuvante en la intubación intestinal.

ZUSAMMENFASSUNG

Die Einfuehrung langer Darmsonden begegnet haeufig Schwierigkeiten, die besonders durch natuerliche Hindernisse (Kardia, Pylorus, Flexura duodenojejunalis) und durch gewisse Krankheitszustaende (Atonie des Magendarmkanals und paralytischen Ileus) entstehen. Viele Kunstgriffe sind erfunden worden, die im allgemeinen die Passage in den Zwoelffingerdarm zum Ziel haben; manche davon

sind nicht einfach auszufuehren, andere nicht ungefaehrlich und alle von zweifelhaftem Erfolg. Der Verfasser hebt hervor, dass bei Krankheitszustaenden, die mit einer Auftreibung des Magendarmkanals einhergehen—und zwar nicht nur beim paralytischen sondern auch beim mechanischen Ileus—, das autonome Nervensystem eine Rolle spielt und schlaegt vor, das Vorruecken der Darmsonden und besonders die Passage durch den Pylorus durch eine Blockierung des N. splanchnicus zu erleichtern und zu beschleunigen. Die Blockierung wird ein- oder zweimal taeglich unter Anwendung der ueblichen Technik mit Zugang von hinten und mit dem Patienten in Seitenlage ausgefuehrt. Als Injektion wird eine Prokainloesung ohne Adrenalin aber unter Zusatz einer kleinen Dosis von Tubokurarin verwendet. Die Erfolge zeigen, dass das Verfahren ein bemerkenswertes Hilfsmittel bei der Darmsondierung darstellt.

RÉSUMÉ

La marche dans l'intestin d'un tube long rencontre des difficultés naturelles ou pathologiques. Plusieurs artifices ont été utilisés, les uns dangereux, les autres banaux-.—L'auteur ensuite disserte sur la physiologie et préconise un procédé pour faciliter la marche des tubes: le blocage des splanchniques.

SUMÁRIO

A intubação do intestino delgado pode, muitas vezes, apresentar dificuldades, as quais são representadas por obstaculos naturais (cardia, piloro, curvatura duodeno-jejunial) ou por obstaculos devidos a condições patologicas (atônia gastro-intestinal, ileus paralitico).

De muitos artificios se tem lançado mão visando a passagem, regra geral, do tubo para o duodeno; algumas técnicas propostas são simples e facilmente executaveis, e outras mais complicadas, e não isentas de todo perigo; o êxito delas, todavia, não tem sido satisfatório.

Propõe o autôr, após demonstrar que e sistêma nervoso autônômo é responsavel pelas afecções gastro-intestinais de ordem distenssiva (não somente de paralizia como tambem de origem mecanica), que, para se conseguir maior facilidade e uma aceleração mais pronunciada na progressão da intubação, que se proceda um bloquêio dos nervos esplanquinicos. Esse bloquêio é feito pela técnica usual, servindo-se da via de acésso posterior, ficando o doente em decubito lateral uma ou duas vêses ao dia. Uma solução de procaina sem adrenalina é indicada, adicionando a essa solução anestesica uma pequena dose de "Tubocurarina."

Afirma o autôr que os resultados obtidos vêm demonstrar que êsse processo é um mêio coadjuvante de real valôr na intubação intestinal.

RIASSUNTO

La progressione dei tubi intestinali lunghi spesso presenta difficoltà sopratutto per la presenza di ostacoli di varia natura (cardias, piloro, flessura duodenodigiunale) e di certe cnvdizioni patologiche (atonia gastro-intestinale e ileo paralitico). Sono stati suggeriti vari accorgimenti sopratutto diretti ad ottenere il passaggio nel duodeno, alcuni non facili di esecuzione, altri non esenti da rischi, tutti di efficacia dubbia. L'autore, stabilito che il sistema nervoso autonomo è interessato nelle distensioni patologiche del canale alimentere, così dinamiche come meccaniche, propone di facilitare ed affrettare la progressione del tubo (specialmente il passaggio del piloro) mediante il blocco degli splancnici. Il blocco viene attuato una o due volte al giorno con la tecnica abituale, per via posteriore, con paziente in decubito laterale. Si inietta una soluzione di procaina senza adrenalina ma con l'aggiunta di una piccola dose di tubocurarina. I risultati dimostrano che questo procedimento è di notevole aiuto nella progressione del tubo.

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AVISO A TODOS OS MEMBROS DO COLEGIO INTERNACIONAL DE CIRURGIOES

A Casa dos Delegados, em 19 de maio de 1952, em Madrid (Espanha), escolheu a cidade de Sao Paulo (Brasil) para séde do futuro IX Congresso Internacional do Colegio Internacional de Cirurgioes, aprovando proposta de S. Exia. o Snr. Governador do Estado, Prof. Dr. Lucas Nogueira Garcez, e designou como Comissao organizadora daquele Congresso os membros brasileiros do "Board of Trustees," sob a presidencia do Prof. Dr. Carlos Gama, que é o primeiro Vice-Presidente Internacional, e Secretário Geral para a América do Sul.

O IX Congresso do Colegio Internacional de Cirurgioes terá lugar em Sao Paulo (Brasil), de 26 de abril a 2 de maio de 1954.

Os temas oficiais escolhidos sao os seguintes: 1) Experiancia com a Socializacao da Medicina em váríos países.

2) Novas aquisicoes da Radiologia com contrastes, em todas as especialidades cirurgicas.

3) Experiancia com o emprego de antibióticos em todos os ramos da cirurgia.

A Comissao organizadora do Congresso procura desde já todos os elementos para que o IX Congresso do C.I.C. seja um dos mais notáveis do Colégio Internacional de Cirurgioes, ao mesmo tempo que uma das mais brilhantes comemoracoes do IV Centenário de Sao Paulo.

Afim de ter com bastante antecedencia dados seguros sobre o numero dos congressistas, e poder satisfatoriamente alojá-los, e programar de maneira absolutamente funcional as sessos, pede a todos os interessados, queiram comunicar imediatemente à Secretaria, no endereco abaixo.

—Prof. Dr. Carlos Gama, Sao Paulo,
Secretaria, Praca Ramos de Azevedo, 209, 7.° Andar, Sala 710, Sao Paulo, Brasil.

Prevention of Pulmonary Complications in Abdominal Surgery

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IT is an erroneous idea that prevention of postoperative complications begins after the operation is over. A great many postoperative complications develop as the result of inadequate preoperative examination of the patient and evaluation of his condition, rough handling of the viscera, faulty determination of electrolyte and protein imbalance, failure to prevent struggling during anesthesia, chilling of the patient, and many other factors that should be considered and taken care of when the surgeon assumes care of the patient.

In the past, surgeons have been so concerned with the mechanics of surgery that they have neglected the patient from the psychologic, biochemical and physiologic points of view. Not only that, but they have placed the blame on the anesthetists and have been satisfied to call most of the pulmonary complications "postoperative pneumonia" or "ether pneumonia", as if these were inevitable sequelae and none of their concern.

Fortunately for the patient, this attitude has changed during the last fifteen years, and the surgeon is no longer merely a well-trained mechanic. His responsibility is the care of the patient as a whole, before, during and after the operation, and he must assume this care in the light of present-day physiology, biochemistry and psychosomatics.

It is impossible in this short paper to discuss the prevention of all the postoperative complications that may arise. Therefore, I shall confine myself primarily to pulmonary complications that occur during the first two weeks after an operation. These complications are frequent and serious and may at times be fatal. It is mandatory that surgeons give their utmost attention to them in order to reduce their incidence, and, if possible, eliminate them entirely.

Incidence.—The incidence[1] of postoperative pulmonary complications cannot be definitely established, the statistics given in most reports are conflicting, varying from 2 per cent to well over 25 per cent. Bronchopneumonia claims about 10 per cent of the total, atelectasis about 80 per cent and embolism about 10 per cent. It is said that embolism is responsible for 2 per cent of *all* deaths and 6 per cent of all postoperative deaths.[1]

For lengthy operations the incidence is greater in the male, especially in the presence of a perforating gastric condition; in the elderly and obese; in the presence of sepsis or malignant disease; after resections; in patients who are in mild or severe shock after a surgical procedure, and after operations on the upper part of the abdomen.

Complications.—There is considerable difference in the mechanism and causation of the pulmonary complications arising during the first few days after an operation and those occurring during the second week.

The complications of the first week are atelectasis, pneumonia, pneumonitis and edema. Though any of these may be serious or fatal, it is during the second week that the most dramatic pulmonary complications occur. The patient usually dies suddenly or within twenty-four hours from a pulmonary embolism.

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Read at the Eighth International Congress of the International College of Surgeons, Madrid, Spain, May 1952.
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COMPLICATIONS OF THE FIRST WEEK

Atelectasis and Other Conditions.—Or collapse of the lung, may be massive, lobular or patchy. It is massive when the main bronchus is blocked, lobular when a secondary bronchus is obstructed, and patchy when many small bronchi meet the same fate. Since the air beyond the obstruction is absorbed, the distant portion of the lung collapses.

In some cases the obstructive material is excessive mucus from air passageways or aspirated gastrointestinal contents. In others the cause may be pulmonary edema, which may be brought on by cardiovascular insufficiency, venous stasis or lowered colloidal osmotic pressure.

Shallow and uneven respiration in itself, however, produces oxygen lack, which increases the capillary permeability of the alveoli, thus increasing pulmonary edema and leading to obstruction and further anoxia.[2] Therefore, *hypoventilation* should be considered one of the main and most insidious causes of atelectasis, since it prevents full expansion of the lung.

Once hypoventilation is established even for a short time, a vicious circle begins. The alveolar lining starts to increase its secretions. This results in great obstruction in the air passageways and consequently greater anoxia and increased atelectasis.

Hypoventilation may be brought on by closeness of the operative site to the diaphragm, pull on the mesenteries, psychogenic factors, heavy retractors, pylorospasm, intestinal distention, tight binders and dressings, tight sutures, extensive dissections, lengthy operations, shock, supine position, excessive isotonic solution, pain, irritating anesthetics and many other conditions.

If atelectasis persists, it leads to secondary infection followed by *pneumonitis* or *pneumonia. Pleurisy* and *bronchitis* are also secondary to atelectasis, infarction or infection. The sputum in the presence of atelectasis is thick and sticky, greenish yellow and nonpurulent. In the presence of infection the sputum is mucopurulent and bacteria are present.

PROPHYLAXIS

In order to prevent these complications, the surgeon should take the following precautions:

Preoperative Measures: 1. Remember that no amount of mechanical knowledge and dexterity can overcome neglect of such important items as fluid and electrolyte balance, protein deficiency and related problems.

2. Obtain a thorough history and make a complete physical examination of the patient to elicit foci of infection and to meet emergencies that may arise because of conditions in other parts of the body.

3. Except in emergencies, make sure of adequate dental hygiene and elimination of foci of infection in the mouth, sinuses and throat.

4. Insist on reduction of the amount of smoking for a week or two before the operation.[3] If the patient has a chronic cough, smoking should be eliminated entirely.

5. Put the patient's mind in a more tranquil state by a good and wholesome approach to his problem. Prepare his mind in such a way that awakening he will not be frightened by such procedures as intravenous feedings, transfusions, etc. In the minds of some these are terminal measures.

6. Never perform an elective operation unless at least three weeks have elapsed since the patient had any disease of the upper part of the respiratory tract. After infection of the lower part of the respiratory tract, wait six weeks or longer.

7. Instruct the patient in the importance of deep breathing and other exercises after the operation.

8. Inspect the patient's breathing ability and his chest expansion, so as to evaluate his respiratory movements. Because of relative fixation of the thoracic cage, the breathing of some persons is almost entirely abdominal. Such patients

need greater freedom of the abdominal wall to breathe efficiently.

9. Start prophylactic chemotherapy or antibiotic treatment of the elderly, the obese, or patients in whom pulmonary complications may easily be initiated because of the known factors.

10. Avoid excessive use of preoperative drugs — atropine, hyosine, scopolamine, morphine and others—that may embarrass breathing and interfere with the normal cleansing capacity of the respiratory tract.

During the Operation: 1. Avoid hazards brought on during anesthesia by irritating anesthetics, prolonged administration of curare, cyanosis, struggling, long or deep narcosis or vomiting, since all of these cause hypoventilation and consequently imperfect drainage and obstruction. High spinal and deep basal anesthesia may cause hypoventilation. The patient's head should be hyperextended and the jaw supported to keep passageways open for air. If necessary, airways and endotracheal suction should be used.

2. Avoid extreme positions: the jackknife position, if excessive, may embarrass not only the respiration but the circulation and bring on shock. The same is true of an excessive Trendelenburg position, which forces all the viscera against the diaphragm.

3. Avoid accidental endobronchial intubation.

4. Control or correct excessive sweating, which might cause the bronchial secretions to become thick and tenacious, but also control the administration of excessive intravenous fluids, which may result in "wet lung."

5. Exercise careful surgical technic by avoiding tissue trauma, the use of heavy retractors, rough handling of viscera, heavy pull on mesenteries, hematoma, excessive dissection of fascia and muscle, ill-planned and roughly made incisions that disturb the function of the abdominal wall and the diaphragm, large abdominal packs, tight skin and retention sutures, etc., all of which cause undue pain and lead to hypoventilation.

6. Make sure that all secretions have been sucked out of the lungs before the patient leaves the operating table.

Postoperative Measures: 1. Make sure of a recovery room well equipped with the proper apparatus, and a well-trained nursing staff. The patient should be moved into the recovery room and early restoration of consciousness established to overcome hypoventilation. The circulation should be stabilized, and all interference with respiratory passageways for secretions and vomitus should be controlled by proper positions and, if necessary, by endotracheal drainage. "Shock position" may embarrass the respiration, and a high Fowler position may impede the circulation. Frequent use of carbogen may be useful.

2. Avoid anything that limits breathing, such as excessive pressure and intestinal distention. Dressings should be readjusted within twenty-four hours and, if necessary, distention controlled by intubation, with avoidance of accidental endobronchial intubation.

3. Relieve pain, so that the patient can breathe and cough easily instead of holding back; but avoid excessive administration of analgesics, which may embarrass breathing.

4. Institute and systematically supervise breathing and leg exercises, including frequent turning in bed and "freedom of bed".

5. Encourage coughing. The patient may be surprised at this, but just the right word about it will bring a joyful response and action. The patient should hold his abdomen when coughing.

6. Encourage postural drainage.[4] Turning the patient on his side several times daily without a pillow, while his back is being treated, is helpful in bringing up secretions. At this time he is encouraged to breathe deeply and to cough. Gentle tapping on the back may also be useful.

7. Combat dehydration, which thickens the pulmonary secretions, but avoid giving excessive intravenous fluids, which may cause "wet lung" and pulmonary edema.

8. Place the patient's mind at ease. This alone may improve the endocrine status as well as that of the nervous system, to facilitating better breathing and contributing to the functional coordination of the entire autonomic nervous system.

COMPLICATIONS OF THE SECOND WEEK

Prophylaxis.—The most dreaded pulmonary complication, embolism to the lungs, occurs in the second week. It is catastrophic for two reasons: it may be immediately fatal, or it may so complicate postoperative recovery as to prolong it indefinitely.

Incidence: Powers estimated that 40 per cent of all postoperative deaths are embolic and that pulmonary embolism accounts for 4 deaths per thousand operations.[5] The largest percentage of pulmonary embolism occurs after resection.[6] It is more common in the obese, the elderly, the cancerous and in smokers.[1]

Clinical Picture: Factors leading to pulmonary embolism are usually present on admission or develop while the patient is under surgical care. Prophylaxis, therefore, should begin as soon as the surgeon has assumed care of the patient. It is during the first postoperative week, however, that symptoms indicating an impending disaster may develop. These may be plainly evident or may escape any but the closest scrutiny. One should be on the lookout for the symptoms and signs of thrombophlebitis and phlebothrombosis. The feet and legs should be examined daily for pain and tenderness. Often pain or tenderness in the calf and the plantar region may be elicited by dorsiflexion of the foot when the patient has no complaint. This is especially true in the presence of phlebothrombosis. Routine postoperative examinations should include close attention to temperature and pulse rate, as these may be the only prodromal signs.

Thrombophlebitis, because of exudative reaction in the wall of the vein, forms an adhering clot and is more apt to be tender. The ankles may become edematous, and in a severe case a "milk leg" may follow. In cases of phlebothrombosis, on the other hand, there is very little inflammation in the endothelium of the veins and the clot is nonadherent. An intraluminal clot moves more freely and therefore is more dangerous.

Etiologic Picture: Coagulability of the blood is increased, owing to injury to the endothelium which releases thrombokinase. However, it is said that anxiety and the stress of an operation may also shorten the coagulation time.[7] Anything that may slow the flow of blood in the veins, such as medication, anesthesia, tissue trauma, lack of exercise, hypotension, pressure on vessels, preoperative and postoperative hypoproteinemia or the position of the patient on the operation table, may also increase the coagulability of blood. "Shelter leg" in England during the second World War was a good example of the latter.

Prophylaxis: From the foregoing data it is evident that, to prevent pulmonary embolism, it is necessary to put into effect all the measures already described. In addition, the surgeon should be on the lookout for Homan's sign; should correct hypotension and increased venous pressure, and, as a further precaution, measure the prothrombin time on the fourth postoperative day.

Anticoagulants should be used as soon as one suspects impending phlebothrombosis or when the prothrombin time has increased.

In the Lahey Clinic,[8] preference is given to anticoagulants over surgical intervention in the treatment of phlebothrombosis. Anticoagulants are used with caution in the presence of disease of the liver. For all patients with varicose veins, elastic bandages are used constantly until ambulation is feasible.

Patients with a previous history of thrombosis should be placed on a heparin-dicumarol regimen as soon as the danger of postoperative bleeding is past (usually about the third postoperative day).[9]

SUMMARY AND CONCLUSIONS

Pulmonary complications in abdominal surgical practice are preventable. Prophylaxis depends on many factors. Though careful surgical technic is essential, preoperative and postoperative care and handling of the patient during the operation, based on psychologic, biochemical and physiologic principles, are of paramount importance. Some of the essential measures in prophylaxis are tabulated.

RESUMEN

Las complicaciones pulmonares en cirugía abdominal pueden prevenirse, dependiendo la profilaxis de muchos factores. Son de capital importancia los cuidados pre, per y postoperatorios, conducidos sobre bases psicológicas, bioquímicas y fisiológicas, además de los inherentes a la técnica quirúrgica. Se consignan algunas de las medidas profilácticas esenciales.

ZUSAMMENFASSUNG UND SCHLUSSFOLGERUNGEN

Das Auftreten von Lungenkomplikationen in der Bauchchirurgie kann vermieden werden. Die Vorbeugung haengt von vielen Faktoren ab. Sorgfaeltige chirurgische Technik spielt dabei eine wesentliche Rolle, aber die prae- und postoperative Pflege und die Behandlung des Kranken waehrend des Eingriffs unter Beruecksichtigung psychologischer, biochemischer und physiologischer Gesichtspunkte sind von ueberragender Bedeutung. Einige fuer die Prophylaxe wesentliche Massnahmen werden aufgezaehlt.

RIASSUNTO E CONCLUSIONI

E' possibile prevenire le complicanze polmonari in chirugia addominale; la profilassi dipende da vari fattori. Benchè sia necessaria una tecnica chirurgica accurata rivestono primaria importanza pure le cure pre- e post-operatorie, il trattamento del malato durante l'intervento, regolato su principi psicologici, biochimici e fisiologici. Vengono elencate alcune delle misure essenziali della profilassi.

RÉSUMÉ

Les complications pulmonaires post-opératoires peuvent être détournés dans les opérations par voie abdominale. Cependant la technique est essentielle, les soins pré et post-opératoires ainsi que l'attention durant l'opération, attention basée sur de la psychologie, biochimie et physiologie sont de première importance. Quelques mesures d'aseptie sont résumées.

SUMARIO E CONCLUSÒES

As complicações pulmonares na clinica cirurgica abdominal são evitaveis. A profilaxia depende de muitos fatôres. Embora cuidadosa tecnica cirurgica seja essencial, cuidados pré e posoperatorios e manuseio do doente durante a operação basedeo em principios psicologicos, bio-quimicos e fisiologicos são de importancia primacial. Algumas das medidas essenciais em profilaxia são tabuladas.

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Teamwork in Anesthesia for the Cardiac Patient

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THERE is no situation in which coordinated effort between the surgeon and the anesthetist pays such dividends as in surgical treatment of a patient whose cardiovascular system is diseased. The decision to operate or not to operate rests with the surgeon and is resolved by weighing the risk to the patient against the benefits that may be expected. Since the anesthetic frequently constitutes a greater threat than does the operative procedure, it is reasonable to assume that the anesthetist can contribute materially to an accurate assessment of the risk involved.

Preoperative Planning and Preparation.—A preoperative consultation should be held between surgeon and anesthetist in order to reach a full understanding of all aspects of the case. The surgeon should clearly outline his proposed procedure. Together they should explore the patient's physical status and arrive at an evaluation of the reserve of his cardiovascular system. A true picture of the latter may require the services of a cardiologist. Such consultation may bring to light conditions that will impose severe restrictions in positioning and may limit or alter the preferred plans of both the surgeon and the anesthetist.

At the preoperative visit every effort must be made to gain the patient's confidence and relieve his apprehension and fear. He is usually aware of his abnormal heart condition and fearful of the outcome of any proposed operation. He is apt to be particularly concerned about the unknown dangers that await him in anesthesia. The surgeon he knows and trusts, but this feeling is not automatically extended to the anesthetist. A personal introduction by the surgeon brings about the most rapid and effective rapport, but if this is not practicable the surgeon should inform the patient that he may expect a visit from the anesthetist. The knowledge that the anesthetist has been selected by the surgeon and enjoys his confidence serves as a firm foundation upon which to build assurance. It is legitimate to impress upon the patient that modern technics of surgery and anesthesia are available to protect him and that he is in the hands of persons trained in their use. Reassurance gained from a sincere discussion will allay apprehension and reduce the need for sedatives.

Correct premedication is aimed at securing the desired degree of euphoria without sedation. This requires a fine degree of judgment, since many such patients are elderly and others may be accustomed to prolonged use of sedatives. Observation of the patient just prior to the operation will provide an opportunity to correct any degree of undersedation by intravenous supplement. Sedation must always stop short of respiratory depression.

Not all types of cardiovascular disorder involve the patient in the same degree of risk. Chronic valvular lesions, congenital abnormalities, thyrotoxicosis, and a history of mild, indefinite coronary episodes will cause the anesthetist little concern if the anesthesia is carefully planned and conducted. Heart block or syphilitic heart disease with aortic insufficiency may cause sudden death. Recent coronary occlusion with myocardial infarction or severe and repeated attacks of angina pectoris present the same hazard. Patients

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with these conditions should be subjected to operation only under the most extreme and urgent indications. A high mortality rate may be expected among patients with frank cardiac decompensation. Evidences of dyspnea, orthopnea, pulmonary congestion or pretibial edema demand postponement of elective surgical intervention until the circulatory system is restored to a state of compensation. No patient with pleural or pericardial effusion or ascites should receive any kind of anesthetic without preoperative drainage of the cavity.

Fundamental Considerations. — There are certain fundamentals of an anesthetic procedure that are desirable under any circumstances but in the presence of disease of the cardiovascular system carry sufficient importance to be considered mandatory. These will be considered briefly.

1. Adequate pulmonary ventilation is a necessity. The damaged heart is as sensitive to lowered oxygen tension as the nervous system, and the response may be more dramatic and sudden. Anoxia increases cardiac irritability and displaces the pacemaker.[1] Ventricular rhythms, including fibrillation, may result. This demands the maintenance of a continuously patent airway, high oxygen concentrations in the inspired atmosphere and efficient carbon dioxide absorption. A heart that barely meets physiologic demands under resting conditions in an atmosphere containing 20 per cent oxygen can hardly be expected to withstand lower blood oxygen levels under the rigorous conditions imposed by an anesthetic.

2. Fluids should be administered slowly and in only that quantity which is necessary to meet the demands of normal fluid balance. The sodium ion should be used sparingly. Blood poured into a circulatory system to correct hypotension which is the result of ineffective cardiac action will only add insult to injury. Blood should be used only to replace losses.

3. The induction must be smooth, with a minimum of excitement and struggling. The excessive secretion of epinephrine resulting from excitement during induction may initiate serious arrhythmias. Coughing, breath holding, spasm of larynx or pharynx and other interruptions in ventilation, which usually are relatively innocuous, may produce enough hypoxia to precipitate calamitous events in a diseased heart. "Sledge-hammer" inductions may save time in a busy operating schedule, but they add immeasurably to the risk.

4. Blood pressure must be maintained at or near the normal level. The efficiency of coronary circulation is dependent upon diastolic pressure.[2] The narrowed lumen and nonresilient wall of a sclerotic artery may so limit the circulatory capacity of the coronary vessels that a minor drop in diastolic pressure will result in deficient circulation and cardiac anoxia.

Choice of Technic and Agent.—Spinal block has always been condemned categorically in the presence of cardiovascular disorders. In general this is a justifiable stand, but there are some situations in which spinal analgesia constitutes less of a physiologic affront than does any other anesthetic procedure. The danger lies in the hypotension and resultant cardiac ischemia which frequently occur with spinal analgesia. The degree of hypotension is almost directly proportional to the number of sympathetic fibers blocked. Recent refinements in the use of hyperbaric and hypobaric technics enable the anesthetist to limit the action of the agent to the segments he wishes to anesthetize.[3] The resultant unilateral or segmental anesthesia leaves unaffected many sympathetic fibers that would have been blocked in achieving the same levels with the old technics.

The advantages of spinal analgesia need not be denied patients with impaired cardiovascular systems if the operation is to be performed upon those parts of the body supplied by nerve trunks below the first lumbar segment. Levels of anesthesia high enough to perform herniorrhaphy may be secured with relative safety, provided the agent is kept strictly unilateral.

Such results require a thorough knowledge of the technic and considerable skill and precision in positioning and handling the patient. The practice of subjecting patients with cardiovascular disease to bilateral spinal blocks above the level of the pubis is condemned.

A regional block, skillfully done, provides safe anesthesia for this type of patient. Too often, however, considerable physical pain and mental trauma accompany these procedures. Toxic reactions, though no more likely to occur in these patients than in others, are more disastrous in their effects. Regional block finds its greatest usefulness in technics of balanced or combined anesthesia.

Cyclopropane possesses some characteristics that make it desirable for cardiac patients. Effective concentrations are nonirritating and admit of high concentrations of oxygen. Induction is rapid and is free from all but the mildest excitement. Laryngospasm may be avoided if the induction is not forced.

The serious disadvantage lies in the fact that cyclopropane so sensitizes the conduction system that dangerous cardiac arrhythmias may be initiated by concentrations of epinephrine normally found in circulating blood.[4] This has resulted in widespread condemnation of its use for a patient with a hyperirritable myocardium.[5] Conversely, McQuiston selected cyclopropane as his first choice for cardiac surgical procedures in children.[6] The controversy will probably continue until some means is discovered to prevent these arrhythmias. Nickerson and Brown[7] presented strong clinical evidence that this protection is effectively afforded by preoperative administration of the adrenolytic drug dibenamine (N,N-dibenzyl-B chloroethylamine). If further investigation substantiates this preliminary evaluation, the principal objection to the use of cyclopropane will have been eliminated.

Nitrous oxide and ethylene are unsuited for patients with cardiac disease, because of the low concentrations of oxygen necessary if these agents are unsupported by other agents. Pentothal is ruled out because of its low analgesic properties and powerful depressant action on the respiratory center. Combinations of nitrous oxide and pentothal, with curare added to secure relaxation, form a satisfactory combination and can probably be used with safety in selected cases. This technic affords a narrow margin of safety, and the danger of hypoventilation and hypoxia is great.

The pharmacologic action of ether upon the heart and vascular system suggests a particular suitability in the presence of pathologic change in these organs.[8] It is effective in mixtures containing well over 90 per cent oxygen. It exerts no depressing effect on heart muscle, and cardiac output is increased with little change in rate. Blood pressure is unaltered in the surgical planes of anesthesia. Ether is a mild respiratory stimulant except in deep planes. It provides skeletal muscle relaxation unexcelled by any other agent. Bronchiolar constriction and spasm are relieved by ether, which differs from cyclopropane or pentothal in this respect. Its analgesic properties are high, and undesirable reflexes are readily blocked. Ether has some notable disadvantages. It brings about some degree of acidosis[9] and lowers the glycogen content of the liver.[10] Inductions with this agent are slow, stormy and very unpleasant. This does not constitute an insurmountable obstacle, since patients may be inducted with either pentothal or cyclopropane. Ether should be administered with a gas machine in preference to open drop methods; higher oxygen concentrations are thus available, and any degree of hypoventilation can be instantly corrected by assisted respiration.

COMMENT

If the same considerations that dictate a preoperative consultation insure a high degree of cooperation throughout the case, the patient's chances for recovery will be greatly enhanced. Diseases of the cardiovascular system place limitations upon both surgeon and anesthetist. Each may

be forced to proceed along lines that will result in less desirable working conditions but may give the surgeon a better chance to observe the long-range results of his work. The thoughtful anesthetist will always endeavor to give the surgeon a patient on whom it is easy to operate, but no surgeon desires comfortable operating conditions achieved at the expense of the patient's safety.

Exaggerated Trendelenberg and lithotomy positions, high rests and lifts, sharp lateral flexion and other malpositions must be avoided. Any position or abdominal packing that limits respiratory excursion or increases the patient's expenditure of energy in the effort to ventilate himself exacts too high a price for improved technical operating conditions. Adequate breathing space must be provided whenever a prone or a lateral position is necessary.

Traction upon and handling of upper abdominal viscera may result in sudden and profound drops in blood pressure and marked narrowing of pulse pressure. This is a manifestation of the celiac plexus reflex and may not be tolerated by a disordered circulatory system.[11]

Good relaxation, wide exposure and quiet respiratory activity may be the principal criteria of a good anesthetic which are evident to a surgeon. Cardiovascular disease may decrease tolerance and reserve to such an extent that the anesthetist will be forced to stop short of the ultimate in his desire to provide optimum operating conditions.

Surprisingly enough, serious cardiac "risks" usually withstand operation remarkably well. Perhaps this is only a clinical impression born of expecting the worst, but it may well be due to a commendable tendency to plan more carefully, handle more gently and temper all excesses when dealing with cardiac disease. Teamwork aimed at further improvement in these considerations will inevitably yield better results.

SUMMARY

The authors present a résumé of current thinking and practice in the employment of anesthetics and anesthetic technics, based on sound pharmacologic and physiologic principles. The importance of teamwork, which should be developed to a point as near perfection as possible, is the point of chief emphasis in this article.

RIASSUNTO

Gli Autori presentano una rassegna delle più moderne correnti di pensiero, usi e techniche di anestesie, basate su sani principi farmacologici e fisiologici. Il lavoro di "gruppo" che dovrebbe essere spinto verso la perfezione, è il punto a cui viene attribuita la maggior importanza in questo articolo.

RÉSUMÉ

Les auteurs présentent un résumé des divers procédés d'anesthésie et d'anesthésiques avec une explication pharmacologique et physiologique de leurs usages. On insiste sur la valeur du travail d'équipe qui doit être développé au plus haut degré de perfection.

SUMARIO

Os autôres apresentam o resumo de uma corrente de pensamento e de pratica no emprego de anesteticos e de tecnica anestesica, baseada em claros principios farmacologicos e fisiologicos. A importancia do "teamwork," que pode ser desenvolvida a um ponto quasi perfento, é o ponto de maior enfase deste artigo.

RESUMEN

Se presenta un resumen del pensamiento y práctica actuales para el empleo de los anestésicos y su técnica, basado en principios farmacológicos y fisiológicos. La importancia del trabajo en equipo, que puede desarrollarse hasta donde es posible la perfección, es el punto básico del artículo.

ZUSAMMENFÄSSUNG

Die Verfasser geben einen Ueberblick ueber die gegenwaertige Theorie und Praxis der Anwendung von Anaesthetika und von Anaesthesieverfahren auf der Basis solider pharmakologischer Grundsaetze. Die staerkste Betonung legen die Verfasser auf die Wichtigkeit guteingespielter Zusammenarbeit, die zu groesstmoeglicher Vollkommenheit entwickelt werden muss.

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Qualifying Examinations for Fellowship in the United States Section of the International College of Surgeons will be held on February 2 and 3, May 4 and 5, August 10 and 11, and November 2 and 3, 1953. The examinations will be given at the Cook County Graduate School of Medicine and the Cook County Hospital. Applicants are requested to address communications as follows:

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Peripheral Block Anesthesia in General Surgery

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PERIPHERAL block anesthesia has an important place in general surgery, and it offers definite advantages over other types of anesthesia in certain cases. Since 1897 there have been many publications on block anesthesia. Most of them have dealt mainly with brachial plexus block, the most important of the blocks and the one of which Labot stated, "Brachial plexus block is the method of choice for all major operations on the upper extremity."

In this presentation of peripheral block anesthesia the advantages, indications, contraindications, procedure of administration, technic in various regions, and complications will be discussed. Much of the information was obtained from personal experience with battle casualties in World War II.

Advantages of Peripheral Block Anesthesia.—Peripheral block anesthesia gives excellent relaxation and complete freedom from pain. It produces less shock in a severely injured patient than do other forms, and it may be used when traumatic shock is present. It is especially useful when the active cooperation of the patient is desired. The patient may be moved early after the operation, and the procedure may be carried out in the outpatient department or in the office. By the use of block anesthesia, general anesthesia may be avoided under the circumstances in which it is least desirable, such as after the ingestion of food, in the presence of infection of the respiratory tract or in the presence of certain cardiac and renal conditions. A therapeutic sympathetic nerve block response often occurs and has a beneficial effect on the circulation of a damaged extremity. In an emergency one anesthetist may administer anesthetics to several patients. Peripheral nerve block also may be used for prolonged operations, and it is often a satisfactory anesthetic for children.

Indications. — Peripheral block anesthesia is extremely useful in tendon and nerve repairs, in which it is so important at times to have the patient's full cooperation. In the reduction of certain fractures and dislocations it is likewise very useful. In the repair of large lacerations, skin grafting, amputations, excision of scars and deformities and other cutting procedures, it is often indicated. Since intraspinal block may be considered a form of peripheral block, the advantages of spinal anesthesia may be mentioned here. In addition to the indications aforementioned, rectal, vaginal, pelvic and abdominal procedures, particularly with intestinal obstruction of certain types, must be considered.

One must also include the therapeutic effect in relation to circulation and pain when peripheral block anesthesia gives the sympathetic nerve block effect that is so important in the presence of vasospastic conditions and certain forms of neuralgia and neuritis.

Contraindications. — In discussing the contraindications for peripheral block anesthesia one should differentiate between relative and absolute contraindications. In general, absolute contraindications include infection in the extremity or near the site of the block, the presence of tumors that may distort the landmarks, psychic unfitness of the patient, and bleeding tendencies. In the early reports of peripheral block anesthesia it was the consensus that this type of anesthesia was contraindicated for small children and for operations lasting over an hour. These contraindications, however, now must be considered only relative. Small reported 151 brachial blocks performed on 150 children between the ages of 15 months

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and 12 years. He stated that the results were very good and the complications negligible. With the use of continuous catheter technics, vasopressors and such agents as tetracaine, regional anesthesia may be prolonged for more than an hour. Small mentioned that in his series the average duration of anesthesia was two and one-half hours, and in 1 case the operative procedure required five hours, during which time the brachial plexus block was reinforced.

Administration.—The solutions generally used include 0.5, 1 and 2 per cent procaine hydrochloride, 2 per cent metycaine, and 0.04 per cent tetracaine with 1:100,000 epinephrine. The 0.5 per cent procaine hydrochloride solution is used only in infiltration technics. Epinephrine is indicated in concentrated anesthetic solutions and highly toxic anesthetic solutions. It is of great value in local anesthesia in highly vascular areas, such as the scalp and the genitalia. It is also of great value in surgical treatment of the nose and throat, as an aid to hemostasis.

There are some precautions to be taken in the use of epinephrine. Pitkin has warned surgeons of the undesirability of epinephrine in concentrations of 1:10,000, especially in operations on the digits. During certain "combined anesthesias," especially when cyclopropane, ethyl chloride, and chloroform are used, the use of epinephrine has been associated with cardiac arrest. In general, its use should be avoided for patients with peripheral vascular disease, hypertension, certain forms of cardiac disease and thyrotoxicosis; it should also be avoided for women in labor, because of its delaying effect.

The gauge of the needle should be the smallest that will allow accurate control of the injection, thus preventing damage to blood vessels or nerves. Usually a ½-inch to 1-inch 23 or 24 gauge needle is used for the preliminary wheal, and a 1½ to 4-inch 21 or 22 gauge needle for the deeper injections. The syringes should be of the lock type, and usually a 10 cc. and a 2 cc. syringe are used. A spare set of syringes and needles should always be at hand.

The amount of the anesthetic solution to be used depends on whether the injection is to be intraneural or paraneural, and the size of the nerve. In paraneural injections twice as much solution should be used, in general 10 to 20 cc. The larger the nerve the more solution should be used.

A great aid in the success of peripheral block anesthesia is the proper administration of premedication. In general, it is wise to administer a barbiturate, because of its specific protective property against procaine hydrochloride reactions. Some form of narcotic should be given unless contraindicated.

The time required for a peripheral block to reach its maximum effect depends to a large extent on whether the injection is intraneural or paraneural. Paraneural injections take about twice as long, in general about ten to twenty minutes. In adults, one should attempt to obtain paresthesias, then give an intraneural or partially intraneural injection. In addition to being quicker, intraneural injection is more nearly perfect. For children, one usually has to rely on paraneural injections.

Intraneural injections may cause damage to the nerve by compression in two areas where peripheral blocks are given: the ulnar groove at the elbow, where the ulnar nerve lies, and the groove just below the head of the fibula, where the perineal nerve is present. By "pulsating" the injections, i. e., by inserting and retracting the needle through the nerve fairly rapidly as the injection is given, overdistention and rupture of the nerve fibers can be avoided. This procedure should be carried out in all the block areas.

In addition to making the injections in this manner, one should attempt aspirations from time to time to determine whether a vessel has been entered.

The skin over the site of the injection should be prepared by shaving, washing with soap and applying antiseptic solutions. The mere wiping of the area with an alcohol swab is insufficient.

Technic of Block Anesthesia in the Various Regions. — Supraclavicular Brachial Plexus: Because brachial plexus block is the most commonly used important form of peripheral block anesthesia, it will be discussed in more detail than the other blocks.

With the patient lying on his back, the head is held in the midline and turned about 45 degrees to the opposite side. The shoulder is depressed caudally, with the arm close to the side. The point of injection is 1 cm. above the midpoint of the clavicle, at the lateral border of the subclavian artery and the lateral aspect of the external jugular vein, over the first rib. A wheal is made at this point. With the index finger on the subclavian artery, the needle is inserted through the wheal in the direction of the first rib, which is slightly medial. An attempt should be made to elicit paresthesias in the arm; if they are noted, 10 cc. of 2 per cent procaine solution is injected. If paresthesias are not obtained, the needle should be inserted to the first rib, which is about 2 or 3 cm. deep. Usually, if the needle is followed along the first rib medially and posteriorly, paresthesias will be obtained.

Chassaignac's tubercle, the transverse process of the sixth cervical vertebra, is palpated. The needle then is withdrawn to the subcutaneous tissue and inserted to the tubercle, where 5 cc. of 2 per cent procaine solution is injected. The needle again is withdrawn to the subcutaneous area and reinserted to the lateral border of the first rib, after which 10 cc. more of 2 per cent procaine is injected. Should paresthesias not be obtained, 20 cc. of 2 per cent procaine may be injected all about the area of the first rib. If anesthesia is desired in the upper arm, a subcutaneous wheal of 0.5 per cent solution of procaine is made all around the arm just below the shoulder.

In children the first rib and the subclavian artery are palpated and a wheal is raised above the midpoint of the clavicle. The needle is inserted medially to the first rib, close to the subclavian artery. The amount of anesthetic solution to be used is determined by the child's age, and one-third of the injection is given here. The needle is withdrawn to the subcutaneous tissue and reinserted about 1/3 inch posterior to the previous injection, and 1/3 of the injection is given here. The needle is withdrawn once more and reinserted 1/3 inch further posteriorly, and the remainder of the injection is given. It is advisable then to wait fifteen minutes before the operation is begun.

Elbow: Although the brachial plexus block usually is given for procedures readily controlled by elbow block, there are certain conditions under which elbow block is preferable. In administering an elbow block the median, ulnar and radial nerves have to be injected individually.

With the patint lying on his back, the arm is placed in 90 degrees abduction and the forearm in extension and supination. A wheal is raised midway between the medial aspect of the internal condyle and the inner side of the tendon of the biceps, at the bend of the elbow. The needle is inserted through the wheal and the superficial and the deep fascia, perpendicular to the skin. When paresthesias are obtained, 5 cc. of 2 per cent solution of procaine is injected. In the absence of radiating sensations, the needle is used to probe deeper and beneath the pronator teres muscle. The injections are made fanwise in the soft structures overlying the humerus beneath the deep fascia across the path of the nerve. Ten cc. of 2 per cent procaine is then injected and the region lightly massaged.

The groove between the internal condyle of the humerus and the olecranon is palpated. Just above the groove the ulnar nerve is located and firmly held. A wheal is raised above the nerve, through which the needle is inserted and advanced toward the nerve and almost parallel to it. When paresthesias are noted, 5 cc. of 2 per cent procaine is injected. Paraneural injection is usually not necessary here.

At the bend of the elbow the tendon of the biceps is palpated. A wheal is raised 1 cm. lateral to the tendon of the biceps. The needle is passed through this wheal perpendicular to the skin surface, toward the external condyle of the humerus. When paresthesias are obtained, 5 cc. of 2 per cent solution of procaine is injected. If no paresthesias are obtained, 10 cc. of the fluid is injected transversely on the anterior surface of the condyle, close to the bone, as well as in the soft structures in its immediate neighborhood.

A continuous wheal of 0.5 per cent procaine solution then is used for the supracondylar bracelet, a band of subcutaneous infiltration passing through the sites of puncture of the three nerves aforementioned.

Wrist: In wrist block as in elbow block, the ulnar, median and radial nerves must be injected individually. With the patient's arm at rest on a board or table, palm up, the median nerve is injected at the level of the ulnar styloid. A wheal is raised between the tendons of the palmaris longus and the flexor carpi radialis. The injection needle is inserted through the wheal, perpendicular to the skin, until the deep fascia is passed. About 0.5 cm. further paresthesias should be elicited, and then 3 cc. of 2 per cent solution of procaine is injected. If no paresthesias are noted, 4 cc. of 2 per cent solution is injected in this general location and 3 cc. more toward the tendon of the flexor carpi radialis. The area should then be massaged to hasten diffusion of the solution.

With the patient's hand in supination, the ulnar nerve is injected at the level of the styloid process of the ulna on the radial side of the flexor carpi ulnaris. A wheal is raised, and the needle is inserted tangentially to the tendon, perpendicular to the surface of the skin. Paresthesias should be noted by the time the needle has passed the deep fascia, when 3 cc. of 2 per cent solution of procaine is injected. If no paresthesias are elicited, the needle is withdrawn and reinserted beneath the tendon of the flexor carpi ulnaris, where 4 cc. of the solution is injected, and then the area is massaged.

The radial nerve is purely sensory, but paresthesias are not obtained at the wrist. Five cc. of 2 per cent solution of procaine is injected subcutaneously, transversely across the head of the radius.

The wrist block is completed by making a wrist bracelet, a continuous subcutaneous wheal all around the wrist at the level of the ulnar styloid.

Hip: In a hip block the sciatic, femoral and lateral femoral cutaneous nerves must be blocked. The patint is placed on the side opposite the one to receive the injections, with the knee and thigh in moderate flexion. A wheal is raised 4 cm. below the midpoint of the iliotrochanteric line, the line that extends from the posteriosuperior iliac spine to the great trochanter of the femur. The needle is inserted through the wheal perpendicular to the skin. At a depth of 5 to 8 cm. sciatic paresthesias may be elicited, when 10 cc. of 2 per cent solution of procaine is injected. If no paresthesias are elicited, the needle is inserted until it strikes the spine of the ischium. If one follows the spine upward and downward with the needle, paresthesias are usually noted. If no paresthesias are noted, 20 cc. of 2 per cent solution of procaine should be injected.

The femoral nerve is injected by making a wheal 1 cm. below the inguinal ligament, just lateral to the femoral arterial pulsations. With one index finger over the pulsating femoral artery, a needle is passed through this wheal until paresthesias are obtained, when 10 cc. of 2 per cent solution of procaine is injected. If no paresthesias are elicited, 20 cc. of 2 per cent procaine should be injected and the area massaged.

It is difficult to obtain paresthesias from the lateral femoral cutaneous nerve, and this is not attempted. A wheal is raised 1 cm. medial and inferior to the anterior superior iliac spine. The needle is inserted perpendicular to the skin

through this wheal down to the bone, and 10 cc. of 1 per cent solution of procaine is injected. The needle then is partially withdrawn, and 5 cc. of 1 per cent solution of procaine is injected medially and laterally in a fanlike manner.

A continuous subcutaneous wheal of 0.5 solution of procaine is injected around the thigh just below the groin.

Knee: In establishing a knee block the internal popliteal and the external popliteal nerves are blocked. With the patient lying on the ventral surface and the legs extended, a wheal is raised at the upper limits of the popliteal space, where an angle is formed by the semimembranous and biceps tendons. The needle is inserted through the wheal perpendicular to the surface of the skin 1 to 1.5 cm. beyond the deep fascia, where paresthesias should be elicited. Five cc. of 2 per cent solution of procaine is injected here. If paresthesias are not noted, the needle is partially withdrawn and reintroduced slightly outward and then inward. If paresthesias are still not noted, 10 cc. of 2 per cent solution of procaine is injected.

The external popliteal nerve may be injected at any level along the posterior margin of the biceps, or at the head of the fibula. With the patient lying on the side opposite the one to receive the injections and the knee flexed, the head of the fibula is palpated and a wheal is raised over the depression just below the head. The needle is inserted transversely toward the bone, which is met after the peroneus longus muscle has been pierced. Here paresthesias are usually noted, and 5 cc. of 2 per cent solution of procaine is injected. If no paresthesias are noted, the solution is injected fanwise in close contact with the bone, 10 cc. of 2 per cent solution of procaine being used.

The knee block is completed by making the garter injections of ½ per cent solution of procaine, a continuous subcutaneous wheal all around the leg just below the level of the tubercle of the tibia.

Foot: For a foot block, the anterior and posterior tibial nerves are injected. With the patient lying on his back, the knee is flexed so that the sole rests on the table near its edge. On the level of the upper margin of the internal malleolus a wheal is raised just on the lateral margin of the tibialis anticus tendon. The needle is inserted through this wheal in a slightly lateral direction, beneath the tendon of the extensor proprius hallucis. Paresthesias should be noted before the bone is reached; then 5 cc. of 1 per cent procaine solution is injected. If paresthesias are not noted, 5 cc. of 1 per cent solution of procaine is injected here over the tibia and 5 cc. more between the tendons of the extensor hallucis and the extensor digitorum longus, a little further laterally. The area is then massaged.

For injection of the posterior tibial nerve the patient lies in the same position. A wheal is raised between the medial edge of the achilles tendon and the posterior upper border of the internal malleolus. The needle is inserted through the wheal horizontally and slightly outward, toward the posterior aspect of the tibia. After the deep fascia has been pierced, paresthesias are usually noted and 5 cc. of 1 per cent solution of procaine is injected. If paresthesias are not noted, the needle is reinserted in the direction of the sagittal plane of the ankle. If paresthesias are still not elicited, 10 cc. of 1 percent solution of procaine is injected beneath the deep fascia, given in two or three areas.

An anklet zone consisting of a continuous subcutaneous wheal, with 0.5 per cent solution of procaine, is made all around the ankle just above the malleoli.

Complications.—The complications following peripheral block anesthesia are relatively rare and usually not serious. However, although they may be rare, they can be serious, and in many instances they occur in an apparently healthy patient who has come in for correction of a minor condition.

There are two types of reaction that may occur, and one should be constantly aware of their possible development. These reactions are:

1. Excitation of the central nervous system, the early symptoms of which, if ignored, can lead to convulsions and death. This reaction is due to toxicity of the anesthetic agent and may be manifested either by (a) stimulation, in which loquacity, nervousness, restlessness, tremors and convulsions may occur, and in which short-acting barbiturates or general anesthesia and oxygen are used for treatment, or (b) depression, characterized by unconsciousness, flaccidity, relaxation, and respiratory and vasomotor depression, which may follow or accompany stimulation, and for which assisted respiration with oxygen should be given at once.

2. Peripheral vascular collapse, which may be manifested by a state of shock, with drop in blood pressure, rapid feeble pulsations, perspiration, pallor and possibly unconsciousness. Treatment is aimed at combating stagnant hypoxia by lowering the patient's head by use of vasopressors and by administration of intravenous fluids and oxygen.

Another type of reaction to the anesthetic agent is the allergic; actually, however, such reactions are rare, and treatment depends on the basis of the predominant pathologic manifestation.

Psychomotor reactions rarely occur, but when they do occur it is usually because adequate psychic sedation was not given.

Vasopressor reactions occur, depending usually on the concentration of epinephrine or other vasopressor drugs added to the anethetic agent. These reactions are characterized by tremors, nervousness, palpitation, tachycardia, precordial pain, an increased rate of respiration and a rise of blood pressure; and, more seriously, by cardiac dilatation, pulmonary edema, ventricular fibrillation and death. Treatment should consist of the administration of quickacting barbiturates, oxygen and even assisted respiration.

Other local complications have been described. Horner's syndrome and hoarseness usually disappear with the wearing off of the anesthetic agent. Hematomas, as a rule, cause no trouble and usually can be avoided by maintaining pressure over the injection site for a few minutes. Infection, pneumothorax, temporary paralysis of the diaphragm and mediastinal emphysema occur very rarely and usually clear spontaneously. Permanent neural damage and death from intravascular injection of the anesthetic agent have been reported, but are extremely rare.

Though complications of peripheral block anesthesia are reported, they are less common, and in general less serious, than are the complications associated with other types of anesthesia. As a prophylactic measure an adequate history should be taken, particular stress being laid on previous local anesthetics and possible complications or sequelae. The patient should be adequately prepared for the procedure, both psychologically and by the administration of sedative drugs, barbiturates being the drugs of choice.

Attention should be paid to the patient's physical status, to correct dosage and concentration of the anesthetic agent, and to the rate of administration of the agent.

A close watch should be kept for premonitory signs of reaction, and the severer reactions must be dealt with as soon as they are noted.

SUMMARY

The usefulness of peripheral nerve block in general surgical practice is discussed, together with its indications and the technics preferred by the author for various regions of the body. Possible complications are listed, but in the author's opinion are less serious than those encountered with other types of anesthesia.

RÉSUMÉ

L'auteur discute de l'utilité du bloquage nerveux périphérique; il en discute les divers procédés, et ses indications appliquées aux diverses régions du corps. Il

énumère les complications jugées cependant moins graves que bien d'autres genres d'anesthésie.

ZUSAMMENFASSUNG

Der Wert der Blockierung peripherer Nerven in der allgemeinen chirurgischen Praxis wird eroertert, und die Indikationen sowie die vom Verfasser fuer die verschiedenen Koerpergegenden bevorzugten Techniken werden dargestellt. Die moeglicherweise eintretenden Komplikationen werden aufgefuehrt; sie sind nach Ansicht des Verfassers weniger ernst als die bei anderen Formen der Anaesthesie beobachteten.

RESUMEN

Se discute la utilidad del bloqueo nervioso periférico en la práctica quirúrgica general, junto con sus indicaciones y las técnicas preferidas por el autor para diversas regiones del cuerpo. Se enumeran las posibles complicaciones que, en opinión del autor, son menos serias que las que se presentan con otro tipo de anestesia.

RIASSUNTO

Viene discussa l'utilità del blocco nervoso periferico in chirurgia generale, e le indicazioni e le tecniche preferite dall'Autore nelle varie regioni del corpo. Vengono elencate le complicazioni eventuali che sono—nel concetto dell'Autore—di minor importanza di quelle che capitano con altri tipi di anestesia.

SUMARIO

A utilidade do bloqueio nervoso periferico na pratica cirurgica é discutida, juntamente com suas indicações e a tecnica preferida pelo autô para varias regiões do corpo. Possiveis complicações são enumeradas, mas na opinião do autor, são menos serias do que aquelas encontradas com outro tipo de anestesia.

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Schedule of 1953 Meetings of the Executive Council
United States Section of the International College of Surgeons

February 21, 1953
May 23, 1953
August 22, 1953
November 21, 1953

Combined Therapy for Pilonidal (Sacrococcygeal) Cyst and Sinus

Roentgen Epilation of Operative Field Prior to Surgical Excision with Primary Closure

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PILONIDAL disease has engaged the interest of general practitioners, dermatologists, orthopedists, proctologists and general surgeons for many years. From the vast number of cases of such disease treated all over the world have come not only many desirable surgical approaches and refinements but much disagreement as to the best method of management, as well as many disappointing results. On two points most observers are agreed: First, pilonidal disease produces disability and loss of earning power. Second, recurrences after treatment are too frequent. As an introduction to the discussion of this subject, the following brief abstract of a case history is pertinent.

On Dec. 7, 1943, a dejected 17-year-old youth was examined at the request of his distracted mother. She explained that her uncommunicative son was suffering from something that soiled his underclothing with a foul-smelling discharge. For more than a year he had remained at home because he had become socially unacceptable.

Examination of this otherwise healthy youth revealed both buttocks to be swollen, indurated, red and exquisitely tender. There was a 4 mm. slit in the midportion of the gluteal cleft, from which flowed thin yellow pus. A thick strand of long hair projected from the opening. The buttocks were covered with a dense growth of moist blond curled hair, suggesting the appearance of thick down or fur.

Although the diagnosis was obviously an active pilonidal sinus with adjacent cellulitis, the challenge was to make this infected area acceptable for surgical attack and to keep it so during the preoperative, operative and postoperative periods. It should be noted that at this time chemotherapy was in its earlier stages—the sulfonomides were crude, and untoward effects were common. Antibiotics were then not available for civilian use. Shaving the hair, though a matter of routine, was not considered sufficient, since its return was to be expected within a few days. It was reasoned that the use of roentgen epilation offered a more logical approach. Such therapy would destroy the hair and delay its reappearance for several weeks, at the same time preventing the regrowth of hair along and within the suture line. Finally, it would produce a cleaner bald area more suitable for wide excision. Accordingly, a dose of 500 roentgens was administered to 2 sacral areas seven days before surgical excision. The successful termination of this condition by primary union and the discharge of the patient from the hospital on the tenth postoperative day led to the application of this form of management in the next 25 consecutive cases (Fig. 1).

While emphasis on the necessity of obtaining and maintaining a clean field both operatively and postoperatively is

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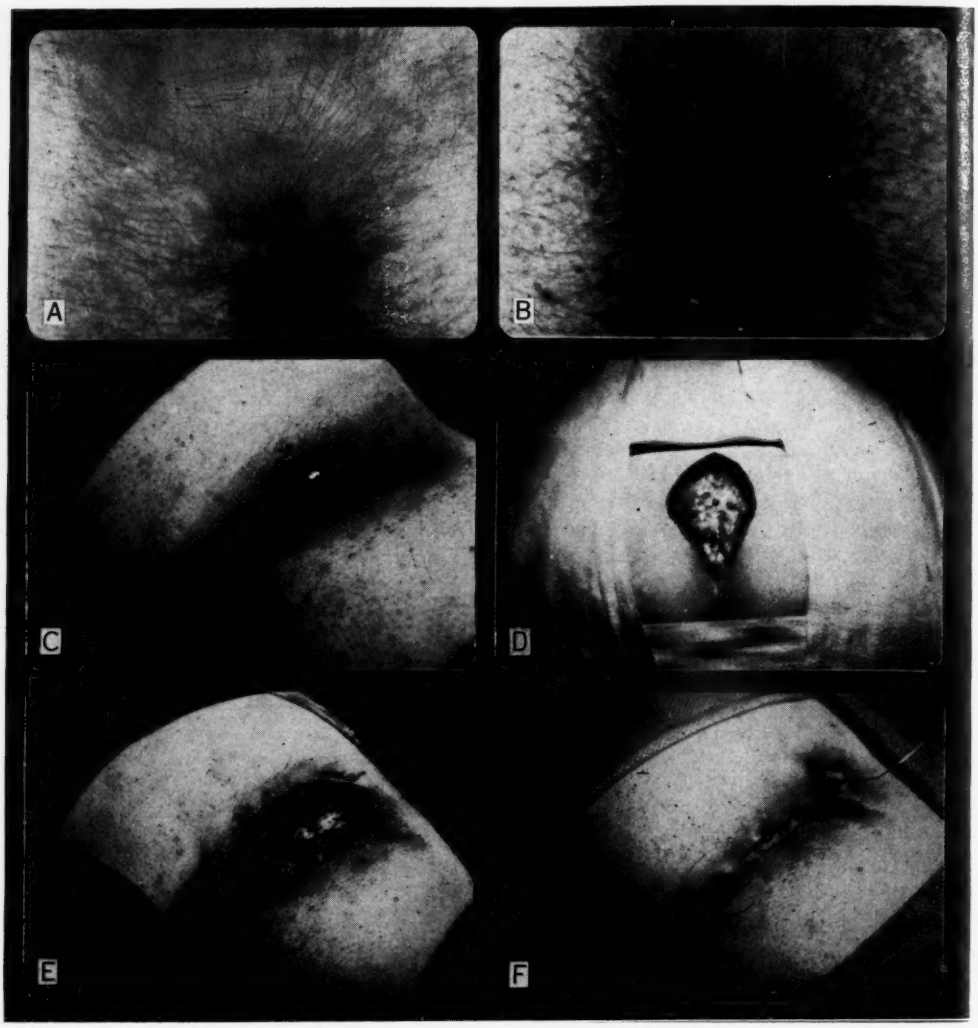

Fig. 1.—*A* (A.P.), first case, eight years after the operation. *B* (W.K.), preoperative photograph. Note healed incision. *C* (W.K.), preoperative draping. Note irradiation "tanning." *D* (E.L.), excision; no electrocoagulation. *E* (W.K.), excision. Dry field. Note areas of coagulation (black). *F* (W.K.), wire closure secured with perforated shot.

certainly not a new concept, apparently the combined therapy of irradiation and surgical intervention to achieve this effect in the treatment of this condition has not been generally reported in the literature. The wide variety of suggested therapy for pilonidal disease during the past twenty years would seem to indicate that this problem has not been completely solved. In an excellent collective review of this subject, Liburt[1] noted that, of many authors, only Smith[2] used roentgen irradiation to prevent the growth of hair from interferring with healing or to control

infection. Six cases were presented, in which the final results were inconclusive. Tunell and Gladstone,[3] in a recent similar review, concluded that "irradiation therapy hardly has any usefulness in the treatment of primary lesions, but it is effective in the treatment of recurrences."

Epilation is not suggested in this communication as a panacea, but rather as another adjuvant method that can be brought to bear in the furtherance of accepted surgical principles. The favorable effect of irradiation on infected skin is well known, but this factor is not considered within the scope of the present discussion. Roentgen irradiation has assisted materially in this series of cases, providing a means by which it is possible to convert a contaminated field (Fig. 1*B*) into a relatively clean one. It has at least retarded hair growth along newly approximated skin edges for a sufficient time to allow the wound to heal normally.

The patient may be epilated either before or after admission to the hospital. In this series the patients have been irradiated from one to thirteen days preoperatively. The average interval has been four days. The series is too small to judge just how long the interval should be, but the cases that have been delayed long enough to show "tanning" of the epilated skin area present a more acceptable appearance and apparently better healing at the end of seven postoperative days (Fig. 1*C*).

The technic of epilation has varied somewhat, since it has been directed by five radiologists and one dermatologist.* The dosage has varied from 250 to 600 roentgens to the field in one or more ports. The average patient is satisfactorily epilated with a dose of 80 to 100 Kv., 5 ma. without aluminum at 25 to 30 cm. For each of 2 patients 0.5 and 1 mm. of added aluminum filtration has been used. According to the opinion of the radiologist, consideration is given to the nature of the skin, whether blond or brunette, as well as to the density and texture of the hair.

Preliminary hospital care consists of cleansing enemas, shaving and preparation of the skin with generous use of soap, water and 70 per cent alcohol. On the morning of operation the skin is again prepared and sterile covers applied. With the patient in the prone position, pentothal anesthesia is induced, the preparation covers are removed and the skin is again prepared, this time with alternate applications of alcohol, ether and alcohol. The anus is carefully blocked off with a large gauze pack. Sterile drapes are then applied and held in position with moist towels.

Avoidance of contamination is one of the primary objectives of this operation. For this reason, there is no probing of tissues and the block excision includes a substantial amount of normal tissue beyond the involved area. This is accomplished by two facing semi-elliptic incisions, which are carried down from the skin to the sacrococcygeal fascia. The elliptic mass thus outlined is seized with a tenaculum and mild traction put upon it. By sharp dissection along the plane of the fat cleavage to the fascia the block is quickly removed and discarded. Up to this point no clamps have been applied. Sponges are used but once, and hemostats are now directed to the individual bleeding points, with inclusion of as little fat as possible (Fig. 1*D*). The bleeding points are secured with fine ties of No. 70 mercerized cotton. Electrocoagulation is used on the small vessels penetrating the fascia (Fig. 1*E*). Hot moist saline packs control capillary oozing. When the wound is dry, one continuous subcutaneous and one continuous subcuticular stitch of No. 30 stainless steel wire close the space with little or no tension (Fig. 1*F*). These sutures are maintained in position by crushed perforated lead shot. A large gauze fluffed dressing, upon which is placed a moist sea sponge, is then applied and held in place by elastic adhesive strips. This dressing is kept above the level of the anus. The patient is transferred to his

*Radiologists, Drs. Ralph Bacon, James Jackman, Carl Lechner, Douglas Nagle, Mitchell Burdick; dermatologist, Dr. Raymond Rickloff.

bed in the prone position. A pillow is then placed under the abdomen and a 3 to 5 pound sandbag affixed to the dressing (Fig. 2*A*). The use of the sponge-elastic dressing and sandbag provides a pressure dressing that prevents capillary bleeding within the wound. Neither the dressing nor the position is changed for seven days. The diet during this time is liquid. No bowel movements are expected and no enemas are given. Although morphine and/or the barbiturates may be used for sedation, rectal suppositories of opium and belladonna are sufficiently effective. They

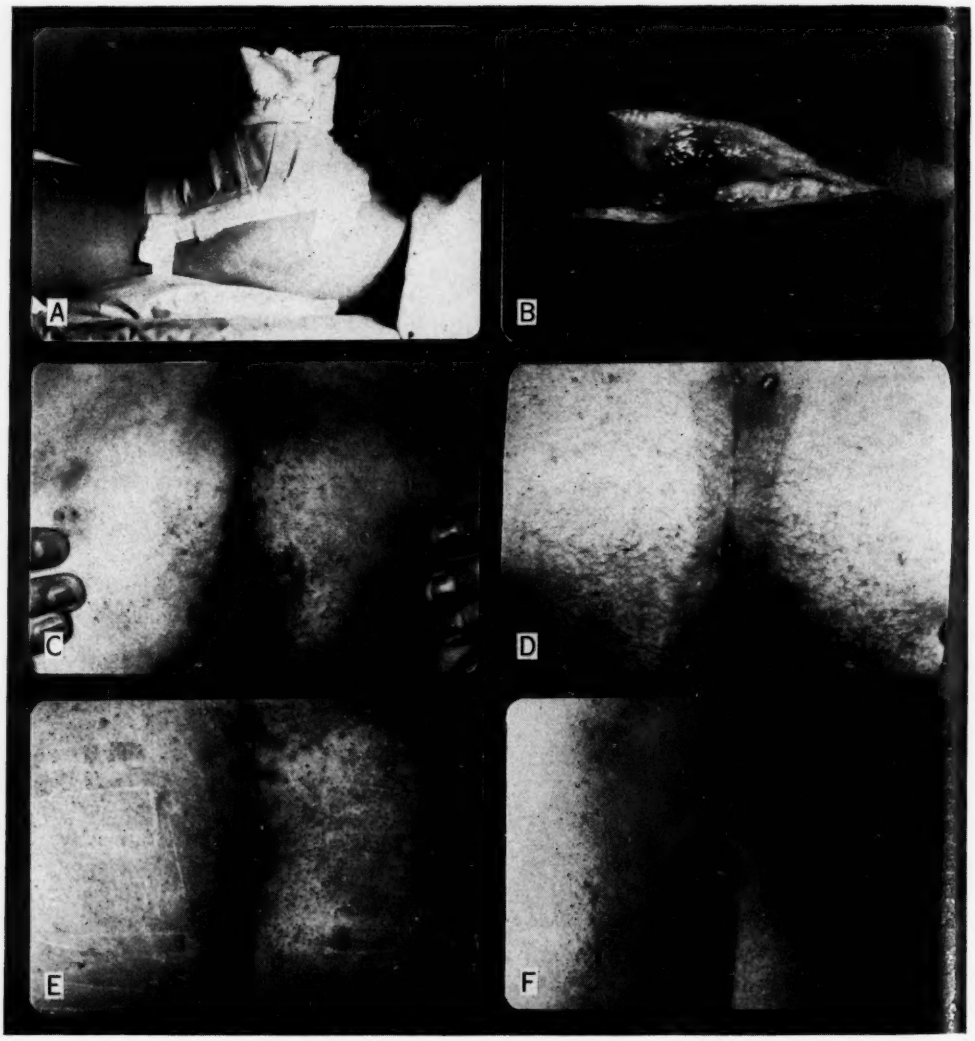

Fig. 2 (W.K.).—*A*, postoperative dressing. *B*, excised specimen. *C*, first postoperative dressing, seventh day. Sutures removed. Note pressure areas at sites of shot. *D*, final result, six weeks after the operation. *E*, condition in 1948. Interrupted wire closure; first dressing, seventh day. *F*, end result.

*Analysis of a Series of Twenty-Six Cases Observed from December 1943 to December 1951 Inclusive:**

Preoperative Roentgen Epilation

Dosage: 250 to 600 r, average 444 r 80-100Kv. 5 ma. o Al 25-30 cm. (0.5 and 1 mm. Al filtration, 2 cases).

Interval between irradiation and operation: 1-13 days; average 4 days.

Postoperative Therapy and End Results

Chemotherapy: Sulfaguanidine, 1 case; sulfasuxadine, 1 case; sulfadiazine, 8 cases.

Antibiotics: Penicillin, 6 cases.

Antibiotics and Chemotherapy: Sulfadiazine and Penicillin, 4 cases.

No antibacterial therapy: 6 cases.

Sedation: Morphine, 13 cases; opium and belladonna suppositories, 9 cases; barbiturates, 2 cases; combined, 2 cases.

Tissue Reports: All positive pilonidal cysts and sinuses; sacral "dimples" not exsised.

Sequelae: Pressure skin necrosis under lead shot, 5 cases; serum collection in wound (evacuated), 1 case; contused would 7th day (resutured), 1 case.

Average postoperative days in hospital: 10.

End Results: Primary union in all cases.

*Age of patients: oldest, 42; youngest, 14; average, 25.4.

undoubtedly contribute to the desired constipation. Chemotherapy and antibiotics, separately or in combination, have been omitted in the last 6 cases, with end results as good as those in which they were given. There has been no wound infection in any of 26 patients.

All tissues removed have been submitted to the pathologist for study (Fig. 2*B*). The clinical diagnosis has been confirmed in each instance. Sacral "dimples" have not been excised.

The wounds are inspected on the seventh or eighth day (Fig. 2*C* and *D*). The upper shot are then cut from the wires, and traction on the lower end of the wires permits easy removal. On 3 occasions interrupted mattress sutures of wire have been used (Fig. 2*E* and *F*). A dry dressing is placed on the healed wound, and the patient is allowed out of bed and permitted to have a bowel movement. In most instances it has not been necessary to administer an enema to produce this first bowel movement.

Untoward postoperative sequelae have not been serious. Five patients exhibited some pressure necrosis in the area of

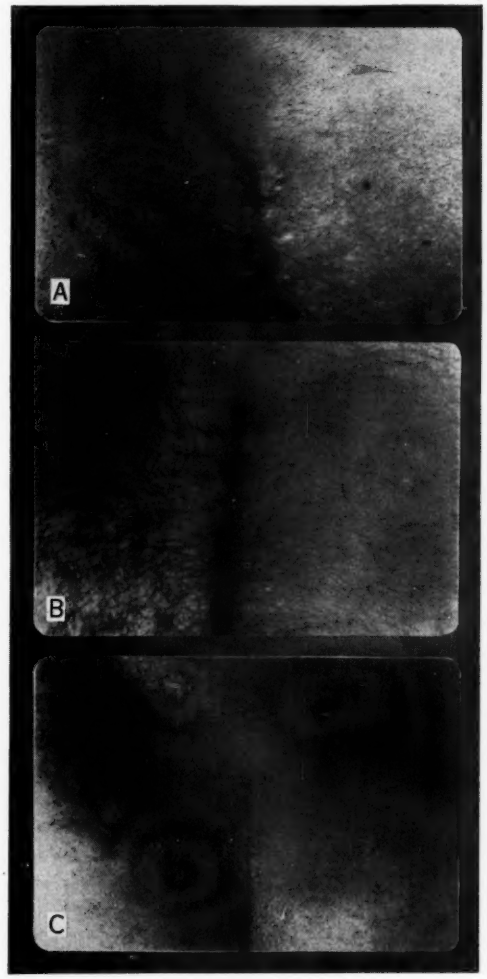

Fig. 3.—*A*, present status of A. Z. (operation Sept. 25, 1946). *B*, end result in case of S. W. Note full return of hair through epilated area. *C*, C. D. twenty-one days after the operation. Note desquamation of epilated area.

the lead shot as a result of too much force in applying the first dressing. In 1 patient a serum collection developed beneath the suture line. This was aspirated, and the wound healed uneventually. The most spectacular incident occurred in a patient who, on being allowed to have a bowel movement on the seventh day, descended upon the toilet seat with such force that he split open the entire suture line. The wound was immediately resutured, and after an additional seven days the new closure healed *per primam*.

From this limited experience it seems reasonable to conclude that the combined therapy of roentgen epilation of the opertive field preceding surgical excision with primary closure has a definite place in the treatment of pilonidal disease. The 26 cases here reported have been followed from one to eight years and no recurrences have been observed. Primary wound healing has occurred in all of the patients (Fig. 3*A*, *B* and *C*).

It is hoped that this form of management will engage the interest of surgeons who have access to a greater number of these cases, so that the method may be further evaluated.

SUMMARY

This is a report on the use and rationale of preoperative skin epilation by Roentgen irradiation and of the operative technic and the postoperative care in the treatment of pilonidal cyst and sinus.

In the series of patients so treated, healing took place by primary union. All of the patients have been followed from one to eight years. There have been no recurrences.

It is the hope of the author that this form of management will engage the interest of other surgeons, who have access to a greater number of these cases, so that the method may be further evaluated.

ZUSAMMENFASSUNG

Es wird ueber die Anwendung und Berechtigung praeoperativer Enthaarung mittels Roentgenbestrahlung bei der Behandlung pilonidaler Zysten und Fisteln und ueber die Operationstechnik und Nachpflege berichtet.

In dieser Serie so behandelter Kranker trat primaere Heilung ein. Alle Kranken wurden ein bis acht Jahre lang nachuntersucht. Es traten keine Rueckfaelle auf.

Der Verfasser hofft, dass diese Form der Behandlung das Interesse anderer Chirurgen, denen ein umfangreicheres Krankengut zur Verfuegung steht, erwecken moege, damit die Methode weiter ausgewertet werden kann.

RÉSUMÉ

L'Auteur rapporte sa technique opératoire des kystes pilonidaux; il rapporte aussi le procédé d'épilation par les Rx et les soins post-opératoires.

Plusieurs patients traités de la sorte ont tous guéris par première intention, sans récidive et suivis pendant huit ans.

RESUMEN

Esta es una comunicación sobre el uso y fundamento de la depilación cutánea mediante irradiación Roentgen, y de la técnica operatoria y cuidado postoperatorio en el tratamiento del quiste y seno pilonidales.

En las series de pacientes así tratados, se produjo cicatrización por primera intención. Todos los pacientes han sido seguidos de uno a ocho años. No han habido recidivas.

El autor tiene la esperanza de que esta forma de tratamiento atraerá el interés de otros cirujanos que disgongan de mayor número de casos, de manera que el método pueda ser valorizado posteriormente.

RIASSUNTO

Relazione sull'impiego della depilazione cutanea preoperatoria mediante raggi Roentgen, e sulla tecnica chirurgica e il trattamento post-operatorio delle cisti e fistole del coccige.

Nella serie di casi presentati la guarigione è avvenuta per prima intenzione. Tutti i pazienti sono stati seguiti da 1 a 8 anni dopo la cura e non vi furono recidive.

L'autore spera che il metodo possa suscitare l'interesse dei chirurghi che hanno l'opportunità di vedere un gran numero di questi malati, così da portare un ulteriore contributo al metodo stesso.

SUMÁRIO

Com referencia ao tratamento dos cistos dermoides, relata o autôr os cuidados previos sôbre a cicatrização da pele, discorrendo acêrca da irradiação, técnica operatória e os cuidados posoperatórios a sêrem observados.

Na serie de doentes tratados pelo processo preconizado pelo autôr, a cura se verificou por "primeira intensão," sendo todos os pacientes observados de um a oito anos, não se tendo verificado recidivas.

Deseja o autôr que o processo por si preconizado mereça a atenção de outros cirurgiões, os quais poderão utiliza-lo em grande numero de casos, podendo, dessa maneira, o processo vir a sêr posteriormente comparado aos demais.

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BECAS OTORGADAS POR EL CAPITULO ARGENTINO

En el transcurso del año 1952 el Capítulo Argentino ha otorgado 4 becas internas y 2 externas, las cuales fueron cumplidas en los siguientes servicios:

Instituto de Cirugía Torácica y de la Tuberculosis, Director Prof. Dr. Jorge A. Taiana:
2 becas internas
1 beca externa

Instituto de Medicina Experimental, Director Prof. Dr. Abel N. Canónico:
1 beca externa

Policlínico Ramos Mejía—Servicio del Prof. Dr. Normando Arenas:
1 beca externa

Policlínico Rawson-Servicio del Prof. Dr. Ricardo Finochietto:
1 beca externa

Policlínico Ramos Mejía—Servicio del Prof. Dr. Carlos M. Masco:
1 beca externa

Carcinoma of Right Breast and Sarcoma of Left Breast, Eleven Years Intervening

Report of a Case

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THIS report is presented to record the presence of mammary carcinoma and sarcoma in the same woman, in whose case eleven years elapsed between her two admissions to the hospital.

The patient, a nullipara aged 38, was first seen in February 1938 for a painless mass in the right breast. There was no history of trauma or discharge from the nipple. The discovery of the tumor was accidental. A radical amputation was performed immediately. The final diagnosis was poorly differentiated adenocarcinoma arising in the ducts. The lymph nodes were normal.

Roentgen therapy was instituted at the Huntington Memorial Hospital in Boston, on March 22, 1938, and completed on April 6. The right supraclavicular area received 1,500 roentgen units, 1,200 units being directed at the axillary portal. Postoperative examinations were made at regular intervals; no recurrence and no metastases were noted.

In November 1949 the patient presented herself with a mass in the left breast, discovered by accident. Lymph nodes were present in the axilla. There was no history of trauma, pain or discharge from the nipple. A radical amputation was accomplished immediately after frozen section biopsy.

At operation, three hard nodules were palpated. On cross section these were gray-yellow and somewhat fatty. There was slight encapsulation. The lymph nodes were multiple, none measuring more than 8 mm. in diameter. The final diagnosis was fibrosarcoma arising in fibro-adenoma, with histologically normal lymph nodes.

Physical examination and roentgen study in January 1952 did not reveal any demonstrable evidence of recurrence or metastasis of either tumor.

There are numerous references in the literature to the coincidental presence of carcinoma and sarcoma in the same breast.

Schlagenhaufer[1] in 1906 reported the dual presence of carcinoma and sarcoma in the breast, with metastasis of both elements.

Kettle[2] in 1912 reported a similar condition. However, the metastastic deposits included only scirrhous alveolar carcinoma cells.

Wilensky[3] in 1919 observed that a composite tumor may consist of two separate nodules growing side by side. Or the mass may be homogeneous, the tissue being composed of cells of mesoblastic and epiblastic origin.

Slaughter[4] in 1868 reported cases of multiple tumors collected from the literature; in 155 of these carcinoma was apparently present in both breasts, occurring independently.

Kilgore[5] in 1921 reported a follow-up study of 659 women with mammary carcinoma, in 37 of whom primary carcinoma subsequently developed in the opposite breast. The statistics indicate that a woman with carcinoma of one breast is three to four times more likely to have carcinoma in the other breast.

References to the independent presence of mammary carcinoma and sarcoma are rare.

Schwarz[6] in 1913 reported a patient operated upon for carcinoma of the left breast. Three years later a sarcoma de-

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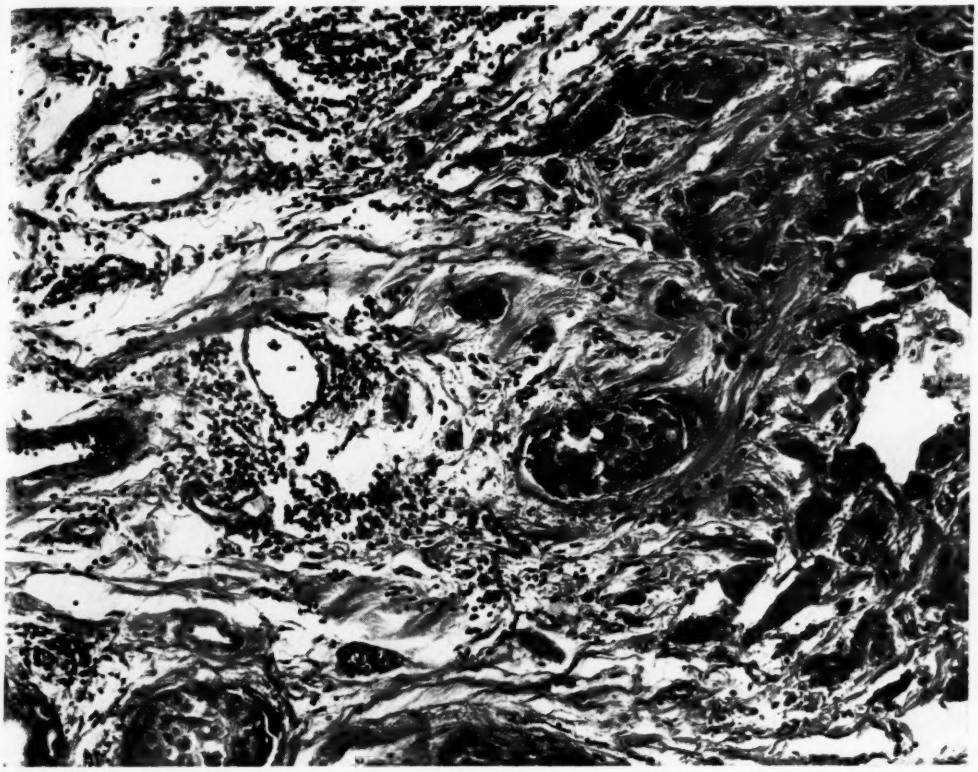

Fig. 1.—Case of E. B., aged 37 (Lawrence General Hospital). Medium power photomicrograph of a representative section. Note both intraductal carcinoma and scirrhous extension, as well as the inflammatory component. The report of the pathologist (Dr. L. S. Jolliffe) was as follows: "Gross: The specimen consists of a right breast with attached pectoralis muscles measuring 10 by 6 cm. and covered by an elliptical piece of nipple-bearing skin 5 by 10 cm. Multiple sections reveal a firm, nodular mass 3 cm. in diameter in the lower outer quadrant. The cut surface of the tumor is grey-white flecked with yellow, slightly protruding, 0.5 mm. areas. Transverse section of the pectoralis muscles and axillary fat show numerous lymph nodes measuring from 0.3 to 1.3 cm. in diameter, grossly uninvolved by tumor. Microscopic: Sections show masses of small and medium-sized ducts filled with epithelial cells evidencing moderate anaplasia, hyperchromatism and mitotic activity. Groups and cords of similar cells are seen infiltrating the surrounding connective tissue, accompanied by increased deposition of collageneous brown substance. There is a diffuse scattering of lymphocytes and plasma cells, indicating chronic inflammatory component. Microscopic Diagnosis: Poorly differentiated adenocarcinoma, growing partly as ductal carcinoma and partly as scirrhous carcinoma."

veloped in the right breast. This growth also showed metastatic carcinoma from the original tumor, apparently unrelated to the sarcoma.

Wakeley[7] in 1933 reported a case of carcinoma of the right breast followed by sarcoma of the left breast after an interval of eighteen years.

Multiple malignant tumors are not pathologic curiostities. McNamara[8] in 1943 reported a 2.7 per cent incidence of multiple malignant tumors in 909 necropsies. Multiple tumors may be expected to increase in the future as more patients with carcinoma survive.

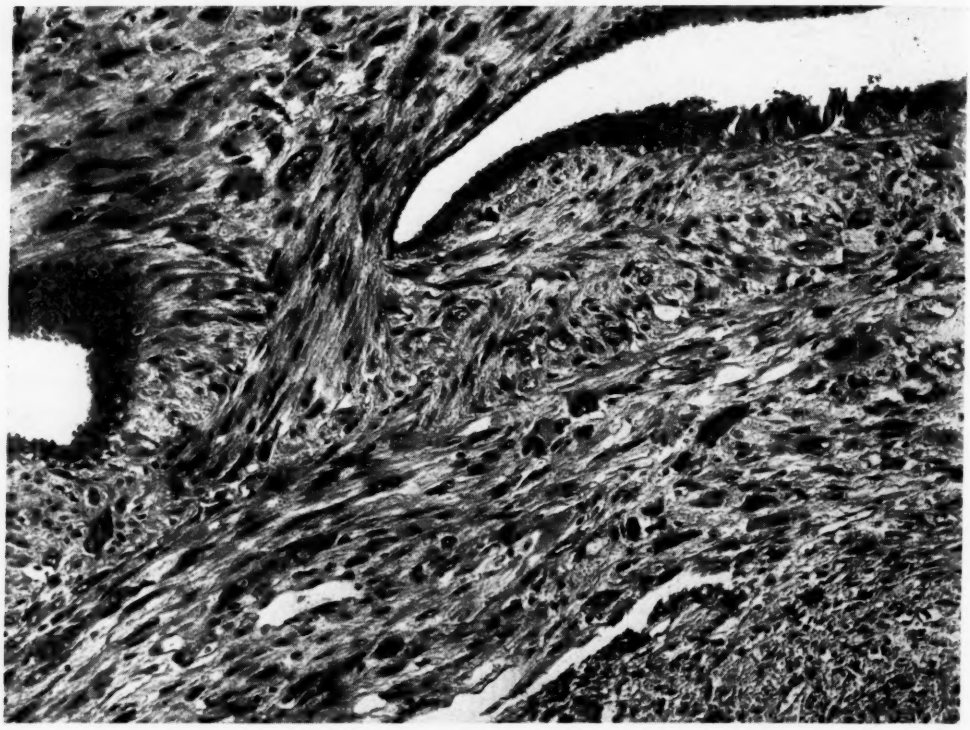

Fig. 2.—Case of E. B., aged 37 (Lawrence General Hospital). Medium power photomicrograph of a representative section, showing two representative ductal components lying within the fibrosarcomatous matrix. Note the marked anaplasia, hyperchromatism, tumor giant cells and mitoses. The report of the pathologist (Dr. L. S. Jolliffe) was as follows: "Gross: Specimen consists of a left breast measuring 14 by 4 cm. and covered by a 10 by 4 cm. elliptical fragment of nipple-bearing skin. A recent biopsy site 3 cm. in length is present adjacent to the nipple. Cut section of the breast reveals two demarcated, but not encapsulated rubbery, semitranslucent nodules measuring 4 by 2.5 cm. in diameter respectively. Multiple sections of pectoralis muscle and of axillary fat reveal only numerous grossly normal lymph nodes varying from 3 to 8 mm. in diameter. Microscopic: Sections from various portions of the tumor mass display two components. The epithelial component consists of large, elongated duct acini lined by epithelium, which in some areas is flattened cuboidal in a single layer, in other areas approaching columnar and in others multilayered and stratified. There is no histologic evidence of malignancy in this component. The second component consists of a cellular matrix of fibroblastic origin that exhibits marked variation in size, shape and staining qualities of the cells but retains a general pattern of parallel and interlacing fascicles. Multinucleate tumor giant cells and bizarre atypical mitotic division are readily demonstrable. Sections of lymph nodes are histologically normal. Microscopic Diagnosis: Fibrosarcoma, probably arising from a fibroadenoma."

SUMMARY

A case of carcinoma of the right breast and sarcoma of the left breast after an interval of eleven years is reported.

Many references are available concerning the coincidental presence of both tumors in the same breast. Reference is made to two reports of carcinoma and sarcoma in separate breasts.

The patient in the case here reported has survived the carcinoma for twelve years and the sarcoma for three years without recurrence or metastasis.

SUMÁRIO

E relatado um caso de carcinoma da mama direita e sarcoma da mama esquerda depois de um intervalo de onze anos. A paciente sobreviveu ao carcinoma por 12 anos e ao sarcoma por trez anos sem recurrencia ou metastases. Numerosas citações bibliograficas são encontraveis a respeito da coincidencia de ambos os tumôres na mesma mama.

E citada a divulgação de dois casos de carcinoma e sarcoma em mamas separadas.

RÉSUMÉ

L'auteur rapporte un cas de cancer du sein droit avec sarcome du sein gauche survenu 1 an après. La patiente a survécu 12 ans après le cancer du sein droit et 3 ans après le sarcome du sein gauche sans récidive et sans métastases. La littérature fournit d'autres cas à l'appui.

ZUSAMMENFASSUNG

Es wird der Fall eines rechtsseitigen Karzinoms der Brust, dem nach elf Jahren ein Sarkom der linken Brust folgte, besprochen. Innerhalb von 12 Jahren nach Auftreten des Karzinoms und innerhalb von drei Jahren nach Auftreten des Sarkoms wurden keine Rueckfaelle oder Metastasen beobachtet.

Es liegen viele Berichte von dem gleichzeitigen Auftreten beider Geschwuelste in der gleichen Brust vor.

Es wird auf zwei Veroeffentlichungen von Faellen hingewiesen, wo Karzinom und Sarkom in verschiedenen Bruesten auftraten.

RIASSUNTO

Viene riferito un caso di carcinoma della mammella destra, seguito da un sarcoma della mammella sinistra a 11 anni di distanza. La paziente è sopravvissuta al carcinoma per 12 anni e al sarcoma per 3, senza recidive o metastasi.

Molti sono i casi di coesistenza dei due tumori nella stessa mammella.

Vengono forniti i dati dei 2 casi di carcinoma e sarcoma nelle due diverse mammelle.

RESUMEN

Se comunica un caso de carcinoma mamario derecho y sarcoma mamario izquierdo con intervalo de once años, habiendo sobrevivido el paciente al carcinoma por doce años y al sarcoma por tres años sin recidiva o metástasis. Muchas referencias pueden citarse a propósito de la coincidencia de ambos tumores en la misma mama. Se hace referencia sobre dos comunicaciones de carcinoma y sarcoma en mamas separadas.

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Chorionepithelioma

Report of a Case and Review of Pathologic, Etiologic, Diagnostic Theraplartic Aspects

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CHORIONEPITHELIOMA may well be called the most freakish and fantastic of all tumors. It originates from cells of another being, the fetal trophoblast. Though in most cases it is highly malignant, spontaneous regressions have been reported. Its incidence shows great variation, as does its start, periods of latency for months or even years being not uncommon. Another peculiarity of this unpredictable neoplasm is the practical difficulty of reaching an accurate diagnosis from curettage. This leads to tragic diagnostic errors or to immediate catastrophic results, such as perforation of the uterus or dissemination of malignant cells.

Since the development of the biologic tests for pregnancy the physician has acquired a diagnostic weapon in his fight against this dreaded and too often unsuspected neoplasm.

Incidence.—Chorionepithelioma is generally considered one of the most malignant epithelial tumors known. Fantastic in its origin—from a cell structure of another organism, the fetus—it is as unpredictable as its course and frequency. Spontaneous regression of apparently highly malignant lesions has been reported. In an eighteen-month period, 7 cases were observed in 2,700 autopsies at Vienna, while in Budapest not a single case could be detected during a search extending over several years. Symmers did not encounter even 1 case in 12,000 autopsies at the Bellevue Hospital. The ratio of chorionepithelioma to pregnancy in Philadelphia during a five-year period was roughly 1 in 13,840. Ferguson, however, stated that probably 10 per cent of all hydatiform moles develop into chorionepitheliomas.

Pathologic Picture.—The pathologic picture shows essentially an exaggeration of the normal chorion. Both Langhans' layer and syncytium are involved and present.

To consider a prevalence of syncytium as a sign of lower malignancy may at times be very disappointing. The invasion of vessels is a much better indicator, and even this may be misleading, owing to the unpredictable nature of the chorionepithelioma. The tumor is a hemorrhagic growth due to vessel invasion. Since stroma is absent, vessels are absent also. As a result, necrosis and hemorrhage are a prominent feature. The lesion may be deeply imbedded in the muscularis or superficially situated on the endometrium. In the former instance the results of dilation and curettage will be negative and these procedures will only help to open the blood sinuses. If not carefully done, they may result in perforation and peritoneal spread.

The chorionepithelioma follows moles, abortions, term pregnancies and ectopic pregnancies, in the order mentioned. Individual reports differ, however, even in this.

Etiologic Background.—The cause of the tumor is not quite clear. Although its harmless but potentially evil ancestor, the normal chorion, has all the earmarks of a malignant growth, such as invading ability and metastasis, chorion cells have often been observed as pulmonary embolisms during normal pregnancy—the pregnant body has apparently a hormonal stop mechanism to absorb these chorionic metastases

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and limit the invasive power of the normal chorion.

For the development of a chorionepithelioma this protecting mechanism must be lost or inadequate, allowing persistence and degeneration of chorionic tissue, which in turn may finally lead to the lesion's appearance. Recent work reported by Perry (J. Mount Sinai Hosp., *16*:291, January-February 1950) pointed to the neurohypophysis as one of the possible links. On these observations a biologic test for malignancy was developed. I quote: "Observations on pituitary hormones and the malignancy of chorionepithelioma: alcohol-ether extracts of urine from patient with malignant tumors, injected into animals cause the body weight/spleen and body weight/gonadotrophic ratios to drop from 20 to 80 per cent below the same ratio in controls. This constitutes a biologic test for malignancy."

Several writers found that the foredescribed test gave positive results in 39 of 40 cases of known malignant disease; the results in all 26 controls were negative.

It is the opinion of these investigators that the pituitary secretes, under sterol stimulation, a substance responsible for the positive result. The pituitary-stimulating sterol seems to be present in the urine in all cases of malignant tumor.

Diagnosis.—The diagnosis of chorionepithelioma prior to the discovery of the pregnancy test by Ascheim and Zondek had to be made from persistent bleeding after curettage, bleeding after expulsion of a mole or abortion, or discovery of metastasis.

This situation has been greatly improved by the pregnancy test, especially the quantitative one. The pregnancy tests are based on an increase of gonadotrophic factor in the blood and urine. This increase can be demonstrated within a few days after fertilization. Its level, however, is not constant. Zondek has already pointed this out, but Evans was able to demonstrate that between the thirtieth and the fiftieth day after the expected but missed menstrual period a tremendous peak of gonadotrophic secretion and excretion is reached.

This fact is very important in evaluating the quantitative pregnancy test. In the presence of chorionepithelioma the prolan excretion is 10 to 500 times that observed in a normal pregnancy. Tests from 0.01 to 1 cc. are often sufficient to produce a positive reaction. Brindeau and Hinglais demonstrated the relation between the amount of luteinizing hormone and the vitality of chorionic tissue. After removal of a mole, 60,000 to 300,000 units of prolan B per liter of blood is observed. Gradually the hormone disappears. Malignant residue, however, will show a rapid increase, as does reactivated dormant degenerating tissue.

Another distinguishing and diagnostically helpful feature of the chorionepithelioma is its almost universally low urine and blood titer for estrogens as compared to the much higher titers associated with normal pregnancy.

Therapy.—The treatment is, in the first place, early recognition of the chorionepithelioma, followed by radical operation and subsequent roentgen therapy. The good results reported by Davis and Brunschwig and in Europe by Starsetzki prove irradiation to be a worth-while aid.

So far as I know, there is no literature on the use and benefit of male hormones as applied in the case here reported.

REPORT OF CASE

The patient, Mrs. M. W., was a teacher of Swedish extraction, aged 32.

Family History.—The father had died of coronary infarction at the age of 58. The mother was living and well and had never been seriously ill. A brother was also living and well.

Personal History.—The patient had had measles, mumps and chickenpox in childhood. The menses, which began at the age of 11, were regular, with no pains. On Aug. 25, 1948, fourteen months after her marriage, the patient was delivered of a female child by classic cesarean section after a long labor without engagement. The baby was in excellent condition and weighed 8 pounds and

11 ounces (3,942 Gm.).

Present Ailment: At the end of July, 1950 the patient missed a menstrual period. On October 6 bleeding began. Since the Friedman test gave a positive result, conservative treatment, including bed rest and the administration of stilbesterol, 25 mg. three times a day, was carried out. The patient continued to gain weight and did not bleed. On December 13, while shopping, the patient had a sudden severe headache followed by abdominal cramps, and passed "clots." A Friedman test gave negative results, and dilatation and curettage were performed for incomplete abortion.

The pathologic report was as follows: "Gross: The specimen consists of ½ cupful of dark red and grey soft spongy shreds and blood clot. Microscopic: Sections of the uterine curettings show organized laminated blood clot throughout. There are small groups of decidual remnants, also groups of dilated and cystic endometrial glands, the stroma of which is densely infiltrated with polynuclears and lymphocytes. Diagnosis: Acute and subacute polypoid endometritis and decidua." The possibility of mole with subsequent chorionepithelioma formation was considered and the patient instructed to report at the office for monthly pregnancy tests. Female Xenopus laevis, an African variety, was used for tests.

In January and again in February, 1951, the result of the frog test was negative. The patient did not report to the office thereafter until June 24, stating that her menses had been regular and had started normally on April 20, the expected date.

After a normal flow the menses did not stop, and the flow was still active on the day of consultation. Sterile vaginal examination revealed a moderately enlarged, somewhat soft-bodied, easily movable uterus, with normal adnexa. The cervix, however, was not soft, nor was the Hegar sign present. There was a continuous bloody flow through the external cervical orifice.

Pregnancy tests, taken in succession, gave at first negative results, then positive, then negative and then positive again. This unstable but apparently re-forming and increasing titer made the diagnosis of chorionepithelioma very likely. However, on the advice of a consultant, dilation and curettage was performed on July 10, instead of a radical procedure to establish a more definite diagnosis. During the dilation and curettage it was realized that only a "positive" scraping could be evaluated, since an epithelioma seated deep in the muscularis would evade curettage, especially since the procedure had to be carried out carefully to prevent perforation.

The pathologic report was as follows: "Gross: The specimen consists of approximately 60 Gm. of clotted blood and reddish brown tissue. There are several large irregular pieces of tissue measuring up to 2 cm. in length. Microscopic: The sections show the specimen to consist chiefly of organized blood clot, throughout which there are groups of large irregular decidua cells with hyperchromatic nuclei. Decidua of a recent pregnancy are present. Note: Continued or recurrent uterine hemorrhage occurring independently of menstruation in this case should warrant a diagnostic curettement."

The patient made an uneventful recovery and was discharged. On August 2 another hemorrhage occurred. At this time, without any further delay, panhysterectomy was performed, with wide removal of adnexa. For further decrease of spread, the structures were first ligated and then clamped and cut.

A roentgenogram of the lungs taken prior to operation showed no metastasis.

The pathologic report included the following observations: "Gross: The uterus weighs 150 Gm. and measures 5 by 6.8 by 10 cm. It has been previously incised. There are a few fibrous adhesions. The myometrium is widely replaced by soft hemorrhagic tissue beginning from the endometrial surface and extending to the serosal surface. The hemorrhagic tissue involves approximately one-third of the myometrium. The cervix shows a few small cysts. One fallopian tube measures 0.8 by 7 cm. The ovary is large and measures 4.8 cm. in length. The second tube measures 0.7 by 7 cm.; the ovary, 4.8 by 4 by 3 cm. It contains numerous follicles and a degenerating corpus luteum 2.5 cm. in length. Microscopic: Sections of the uterus show alveolar and cord-like masses of large irregular basophilic trophoblastic cells of the syncytial and Langhaws types, extensively invading the myometrium. There are extensive areas of hemorrhage and, in places, necrosis. Diagnosis: Typical pleomorphic chorionepithelioma. Watch for metastasis (particularly to the lung). Ovary: Recently resolved corpus luteum; multiple follicular cysts. Fallopian tube: No significant histopathologic change."

The patient made an uneventful recovery, but on the eighth postoperative day a floor nurse called my attention to sudden moderate vaginal bleeding and expressed some doubt as to whether the vaginal sleeve might not have opened. On examination a deep purplish, pea-sized bleeding efforescence was observed in the anterior wall of the vagina, close to the urethral orifice. The rest of the vagina was normal. This mass had been absent just prior to operation and represented a local retrograde metastasis. Under extensive roentgen therapy the metastatic growth disappeared, and there was no recurrence.

Five months after the operation the pregnancy test still gives a negative result; the lung fields are clear, and there are no retrograde metastases. The eythrocyte count increased from 2,000,000 to 4,200,000 per cubic millimeter of blood, and the hemoglobin level from 39.5 per cent to 78 per cent. The hot flashes are combated successfully with injections of testosterone. The male sex hormone may also prove valuable in impeding the recurrence of a malignant tumor peculiar to the female sex.

SUMMARY

A case of chorionepithelioma is presented. The incidence, pathologic picture, etiologic background, diagnosis and treatment of this condition are discussed.

RIASSUNTO

Viene descritto un caso di chorionepitelioma—di cui vengono successivamente discusse la frequenza, l'anatomia patologica, l'etiopatogenesi, la diagnosi e la cura.

SUMARIO

Um caso de chorionepithelioma é apresentado. A frequencia, quadro patologico, historia etiologica, diagnostico e tratamento são discutidos.

ZUSAMMENFASSUNG

Verfasser berichtet ueber einen Fall von Chorionepitheliom. Die Haeufigkeit, das pathologische Bild, der aetiologische Hintergrund, die Diagnose und die Behandlung werden eroertert.

RÉSUMÉ

L'auteur rapporte des cas de chorioépithéliome et discute la fréquence—l'étiologie—le diagnostic et le traitement.

RESUMEN

Se presenta un caso de corioepitelioma. Se discuten la frecuencia, cuadro patológico, fondo etiológico, diagnóstico y tratamiento.

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1953 MEETINGS OF THE INTERNATIONAL COLLEGE OF SURGEONS

Regional Division Meetings, United States Section

TRI-STATE ASSEMBLY OF TEXAS, Arkansas and Oklahoma, Adolphus Hotel, Dallas, Texas, Feb. 5-7. Dr. Curtice Rosser, 710 Medical Arts Building, Dallas, Texas, Chairman.

PENNSYLVANIA AND SURROUNDING STATES, Bellevue-Stratford Hotel, Philadelphia, Feb. 13-14. Dr. Moses Behrend, 225 South 17th Street, Philadelphia, Chairman.

MISSOURI DIVISION, Statler Hotel, St. Louis, Missouri, March 31 to April 2. Dr. Roland M. Klemme, 4952 Maryland Avenue, St. Louis, Missouri, Chairman.

TENNESSEE DIVISION, HERBERT ACUFF MEMORIAL MEETING, Knoxville, Tennessee, April 24-25. Dr. Park Niceley, Acuff Clinic, 514 West Church Street, Knoxville, Tennessee.

ILLINOIS DIVISION, Congress Hotel, Chicago, May 5-6. Dr. Karl A. Meyer, 30 N. Michigan Avenue, Chicago 2, Illinois, Chairman.

EIGHTEENTH NATIONAL ASSEMBLY, UNITED STATES SECTION, Waldorf-Astoria Hotel, New York City, September 14-18. Dr. Horace E. Ayers, 75 Central Park West, New York 23, Chairman.

INTERNATIONAL MEETINGS*

FRENCH AND DUTCH SECTIONS, Palais de l'Institut Colonial, Amsterdam, The Netherlands, April 8-10. Professor Raymond Darget, 17 rue Casteja, Bordeaux, France, Chairman.

ITALIAN SECTION, University of Rome, Italy, June 5, 6 and 7. Professor Raffale Paolucci, Via a Guattani 8, Rome, Italy, Chairman.

SWITZERLAND MEETING, University of Geneva, Switzerland, June 10-11. Professor Albert Jentzer, 8 rue de l'Universite, Geneva, Switzerland, Chairman.

SECOND ASSEMBLY BRAZILIAN SECTION AND FIRST PAN AMERICAN CONGRESS, Curitiba, Parana, Brazil, October 5-9. Professor Rudolpho Freitas and Dr. Waldyr Silva Prado, Rua Cesareo Motta 112, Sao Paulo, Brazil, Chairmen.

*For detailed information write: Dr. Max Thorek, General Secretary, 1516 Lake Shore Drive, Chicago 10, Illinois.

ANNUAL NATIONAL CONGRESS

United States and Canadian Sections

NEW YORK, WALDORF ASTORIA HOTEL, September 14-18. Dr. Horace Ayers, General Chairman. For full information address:
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Chicago, Illinois

Suction Socket Prosthesis for Above Knee Amputation

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LOS ANGELES

WE HAVE had an opportunity to study and observe more than 150 suction socket prostheses for amputations above the knee. These cases represent those observed during the training and experimental programs of the Committee on Artificial Limbs of the National Research Council and the Veterans' Administration, plus observations on private patients.

In 1863 Parmelee of New York obtained the first known patent on the suction socket. Subsequent patents were issued to Beacock and Sparham of Ontario, Canada, in 1885; to Tole of Stockton, California, in 1911; and to Underwood of Birmingham, England, in 1926.

After the first World War several groups in England employed the suction socket, with variable results. However, use of the suction socket in England, dormant for a number of years, has been revived recently. In Germany the suction socket was made and used to some extent after World War I, but it was not popularized until a satisfactory valve was devised in 1932. Since that time, and especially during the recent war, it has been used for many above-knee amputations.

The Surgeon General of the United States Army in 1946 sent a commission on amputations and prostheses to Europe to observe foreign practice. One principal item of interest was the successful use in Germany of suction sockets for above-knee prostheses. The Advisory Committee on Artificial Limbs of the National Research Council then instituted a program to investigate the use and development of the suction socket leg. This work has been sponsored by the Surgeon General's office and the Veterans Administration and has had the cooperation of the Army and Navy Amputation Centers, commercial limb manufacturers and several engineering firms working under the supervision of the Advisory Committee.

Schools for the purpose of indoctrinating surgeons and limb fitters in the problems of the suction socket prosthesis were organized in key centers of the United States, beginning in the latter part of 1947. These were conducted by the Veterans' Administration and the Orthopedic Appliance and Limb Manufacturers' Association. After completion of a week of intensive study in each of these schools, both the orthopedic surgeon and the limb fitter were "certified". Subsequently clinics were established in the key centers by the Veterans' Administration for fitting and observing the suction socket above-knee prosthesis on veteran amputees. These clinics have been highly successful and have been conducted with limb fitters, physiotherapists and often occupational therapists all present and collaborating, with an orthopedic surgeon in charge. This cooperation and pooling of ideas has been beneficial to all.

The observations and experiences of these various groups established the fact that the suction socket leg is an eminently satisfactory prosthesis. In 1950 it was removed from the experimental phase and approved by the Veterans' Administration for general use.

The special characteristics of the suction socket prosthesis are:

1. In contrast to the conventional arti-

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ficial leg, it has no pelvic hinge, belt or shoulder harness.

2. The leg is held on by a slight negative pressure or vacuum.

3. The socket is made to fit snugly in order to maintain an air seal but does not restrict muscle action or circulation in the stump.

4. Suction is maintained by the accurate but not too snug fit of the socket, which is sculptured to suit the individual amputee.

The advantages of this prosthesis are:

1. Elimination of the conventional pelvic hinge and belt gives the amputee more freedom of motion and comfort, and there is less interference with clothing.

2. The leg feels more like an integral part of the body, without the sensation of too much dead weight.

3. There is improved control and sense of position.

4. There is greater toe clearance, owing to the reduced piston action of the stump in the socket.

5. No stump sock is necessary.

6. Active use of the stump muscles allows them to become hypertrophied instead of atrophied.

Indications. — The improved function permitted by a properly fitted suction socket leg makes it advantageous for practically all amputees. It is, however, of particular advantage in the following cases:

1. Impairment of the opposite leg, such as a stiff knee, paralysis or amputation. Greater ease in walking is possible in these cases, owing to decreased piston action and the resultant increase in toe clearance.

2. Painful scars over the crest of the ilium or the sacrum. Elimination of the pelvic belt permits wearing a prosthesis that might otherwise not be tolerated.

3. A pendulous abdomen, in the presence of which obesity or pregnancy would interfere with the wearing of a pelvic belt.

4. A short stump, with little or no control possible without suction holding the prosthesis closely to the stump.

Contraindications.—There are actually few contraindications. Advisement of a suction leg should be carefully considered in the presence of the following conditions and circumstances:

1. Active osteomyelitis. This should be eliminated before a prosthesis is fitted.

2. Extensive scars, especially at the top of the socket. These should be repaired surgically so that suction can be maintained.

3. Extensive skin disease. A dermatologist can usually eliminate these conditions. Chronic boils with a large adductor roll can be eliminated by a properly fitted socket that pulls this roll down inside the top of the socket.

4. Large tender bony spurs. These can be eliminated surgically.

5. Unfavorable psychologic factors. A careful evaluation should be made of each patient to determine whether he is "mentally capable" of cooperating, and also whether he can and will return for multiple adjustments, which are often necessary.

6. Arterial disease with reduced circulation. This is not a contraindication, although it was formerly thought to be. Capillary fragility falls in the same class.

7. Stumps shorter than 4½ to 5 inches (10.7 to 12.7 cm.). These offer difficulty, especially with loss of suction in the sitting position or in getting in and out of an automobile. Proper fit and alignment may, however, overcome this problem.

Construction of the Socket. — Various types of material have been used for the construction of a suction socket, but willow wood has proved the most satisfactory. It can be either enlarged or diminished by cutting out or by the addition of a leather liner to accommodate the changing size of the stump. Plastic material can be used later, when the stump has become stabilized in size and shape.

A definite pattern can be used for the rough outline of all sockets at the level of the ischial tuberosity. The pattern size is obtained by the measurement through the

crotch and around the gluteal crease. It is emphasized, however, that the pattern is only a general outline, as each case has to be carefully individualized according to the patient's muscular development and the thickness of the subcutaneous fat and bony structure.

The medial side of the socket is important and must allow room for the adductor muscles. A socket that is too tight or too high medially will cause painful irritation. If a medial adductor roll is present, the socket is made larger on the medial and anterior sides to allow the adductor roll to be pulled into the socket. The roll will then diminish or disappear.

The ischial seat is of major importance. It should not be too deep, as this causes irritation in sitting. If it is not beneath the ischial tuberosity, slipping may occur to either the inside or the outside, creating much discomfort. A sharp anterior edge may be painful; hence, the seat should be sloped slightly to the inside of the socket and the front edge rounded somewhat. An amputee with well developed muscles may push the ischial seat away from the tuberosity and carry the weight on the muscles. The socket should be aligned in slight flexion to assist in proper ischial weight bearing.

Posteriorly the socket is cut out for the gluteal muscles and varies according to their size. The height of the socket should be the same as the ischial seat, as these muscles can carry a good deal of body weight.

The lateral side should be somewhat higher, extending to just below the tip of the greater trochanter, and from here it slopes across the front to the medial side. Laterally and anteriorly it should not be so high as to interfere with abduction and flexion of the stump. A snug fit behind the greater trochanter frequently necessitates a moderate protuberance on the inside of the socket in this location. This proturberance assists in control of the prosthesis, especially in rotation; assists in stabilizing the tuberosity on the ischial seat, and helps to maintain suction in the sitting position.

The Germans report the use of a belt about the hips which has become known as the Silesian bandage. They state that this prevents undue pressure over the anterior part of the stump. We have had no experience with this belt except in a few cases, but when we tried the belt the amputee preferred to wear the leg without it.

Anteriorly the socket fits snugly, but not so snugly as to cause pressure on the femoral vessels.

The medial height is varied according to comfort but generally is about at the level of the ischial seat.

A tapered undercut from the top of the socket downward is generally indicated. This is especially advisable if the stump is flabby, and to accommodate large muscle masses.

In the initial phase of the experimental program fittings were too tight. It is now recommended that a snug fit be made only for the proximal part of the stump. The middle portion should fit the contour of the stump when the muscles are tensed, and the distal portion should be sufficiently roomy to allow the stump to be free and without pressure.

Free space distal to the end of the stump is not too important, although approximately 2 inches (5 cm.) is sufficient to allow for valve installation.

In the presence of a long stump, partial end bearing is recommended if tolerated, as this relieves ischial pressure and improves circulation in the stump end.

Cellulose acetate or lacquer has been the most satisfactory material for finishing the inside of the socket.

Some variation in opinion exists as to the most suitable valve. In our experience a springless valve, which is in effect a flap valve, has been highly satisfactory. It permits automatic expulsion of air in the stance phase and closes during the swing phase. It remains open when the patient is seated or reclining, permitting a partial exchange of air within the socket. This lessens the problem of perspiration.

Proper alignment of the suction-socket leg is imperative and must be determined

on the basis of observations while the amputee is walking. Indications of improper alignment are excessive rotation of the foot on heel strike or toe off, whipping of the shank in either the medial or the lateral direction in the swing phase and lateral instability during the stance phase. Common causes are: improper setting of the knee bolt in relation to bowed or knock knee; incorrect external or internal rotation of the knee bolt; ankle joint set at the wrong angle to the foot, and toe break not perpendicular to the line of progression.

Common errors in construction are: 1. Ischial seat too large or edge too sharp or not placed beneath the tuberosity. 2. Anterior-posterior dimension of the socket too large, permitting the tuberosity to slide forward off the seat and thus producing anterior pressure and some piston action. 3. Crowding of the adductor muscles. 4. Too large a gluteal channel. 5. Fit in the lower portion of the socket too tight, constricting the distal part of the stump.

The size of the stump will vary, especially early, and frequent changes of the socket will be necessary. The two variables in stump size are subcutaneous fat and muscle. In the earlier stages excess fat will usually diminish and muscles will become hypertrophied. This results in a marked alteration of the shape and size of the stump, with an increase in the circumference distally and a decrease proximally. Almost invariably the stump later becomes enlarged, owing to muscular hypertrophy.

Edema is the most serious complication and is usually due to too tight a fit at the bottom, the top, or the entire surface of the stump. This complication can usually be corrected by reshaping and refitting the socket. No amputee should be permitted to wear the leg when edema is present.

Perspiration is at times a problem, but either silica gel placed in the bottom of the socket or a 20 per cent solution of aluminum chloride applied to the stump every three or four days is effective in control. In rare instances an allergic reaction to aluminum chloride may occur.

Adults and children of both sexes have been successfully fitted. Elderly persons with advanced arteriosclerotic disease present difficulty in fitting, as there is lack of balance. A pelvic band gives a feeling of greater security.

Our few failures have been largely due to the failure of amputees to cooperate, or to the fact that some could not return for the follow-up visits and corrections necessary to accommodate the changing size of the stump. This group includes a small number with psychiatric difficulties.

Patients with both legs amputated above the knee have been successfully fitted, although there are pronounced difficulties. There were 3 such cases in our series. Two of the amputees died of intercurrent disease before either had become a good walker. The third, although he is using his bilateral prostheses, has been followed only for about nine months. Other authors have reported success. The most troublesome factor in fitting such an amputee is the absence of one stable extremity for the amputee to stand on while the other stump is put into the prosthesis.

It is much easier to fit a suction socket initially than to convert the patient who has worn a conventional prosthesis for many years. The patient must have the desire and willingness to endure the time-consuming adjustments and reconditioning necessary to become a successful wearer.

SUMMARY

After study and observation of more than 150 cases in which suction socket prostheses were used for patients with legs amputated above the knee, the authors agree with most other workers in this field that the prosthesis has numerous advantages and is recommendable for this purpose.

Cooperation between the patient, the limb fitter and the surgeon is extremely important. In order to wear the prosthesis successfully, the patient must be able and willing to spend the extra time required for follow-up visits and adjustments. The

limb fitter must be qualified in the construction of a socket and in proper alignment. The surgeon must be qualified to act as advisor and coordinator in the various problems that may be encountered.

The outstanding features of this device are as follows: 1. It eliminates pelvic bands, shoulder harness and stump socks. 2. It is better controlled and thus allows greater range of motion and better walking. 3. It feels like an integral part of the wearer and not like a dead weight. 4. It is less bulky and interferes less with clothing.

RÉSUMÉ

On étudie 150 cas d'amputations de la jambe au-dessus du genou qui ont bénéficié d'une prothèse avec ventouse à succion. Tous les auteurs sont du même avis et recommandent cet appareil. Il faut une entente entre le patient, le chirurgien et la manufacturier d'appareil. Le patient, s'il veut le meilleur résultat, doit s'evertuer à se faire suivre régulièrement pour un bon ajustement de sa prothèse. Le manufacturier doit être un homme compétent dans la fabrication des pièces de ptorhèses; tandis que le chirurgien doit agir comme coordonateur. Les avantages de cette pièce sont les suivants: 1° Pas de centure pelvienne, ni de corset ni de douille du moignon. 2° le contrôle est plus facile pour la marche. 3° elle fait partie du patient lui-même. 4° elle est moins encombrante et ne gêne pas l'habillement.

SUMARIO

Depois do estudo e observação de mais de 150 casos em que a protese a sucção de malha foi usada para pacientes com amputação acima do joelho, os autores chegam a um acôrdo com a maioria de outros especialistas desse campo de que esta protese oferece numerosas vantagens e é recomendavel para essa finalidade. A cooperação entre o paciente, o oficial ortopedico e o cirurgião è extremamente importante. Afim de usar a protese com sucesso, o paciente deve ser habilidôso e desejôso de dispender o tempo extra, requerido para ulteriores visitas e ajustes. O oficial ortopedico deve ser habilitado para a construção de meia de malha e do alinhamento adequado. O cirurgião deve ser qualificado para agir como conselheiro e coordenador dos varios problemas que podem ser entrontados.

As qualidades superiores desse aparelho são as seguintes: 1. Ele elimina a cintura pelvica, correia de ombro e meia de côto. 2. Ele é melhormente controlavel e isso permite maior amplitude de movimentos e malhor marcha. 3. Age como parte integral do possuidor e não como um pêso morto. 4. E menos volumôso e interfere menos com a vestimenta.

ZUSAMMENFASSUNG

Auf Grund von Untersuchungen und Beobachtungen an ueber 150 Kranken, bei denen nach Beinamputation oberhalb des Knies Saugpfannenprothesen angewandt wurden, stimmen die Verfasser mit den meisten anderen Bearbeitern dieses Gebietes darin ueberein, dass diese prothese zahlreiche Vorteile bietet und empfohlen werden kann. Zusammenarbeit von Patient, Prothesenmacher und Chirurg ist aeusserst wichtig. Um die Prothese mit Erfolg zu tragen, muss der Patient in der Lage und bereit sein, die notwendige Zeit fuer Nachuntersuchungen und Korrekturen aufzubringen. Der Prothesenmacher muss in der Anfertigung der Pfanne und in sorgfaeltiger Anpassung erfahren sein.

RESUMEN

Se acepta con otros muchos autores que la prótesis tiene numerosas ventajas y es recomendable en pacientes con piernas amputadas arriba de la rodilla, en virtud del estudio y observación efectuados en más de 150 casos en los que se usó prótesis con casquillo de succión.

Es extremadamente importante la cooperación entre el paciente, el provedor ortopedista y el cirujano. Con objeto de

obtener los mejores resultados con la prótesis, debe el paciente disponer del tiempo y la voluntad requerida para visitas y ajustes sucesivos. El provedor ortopedista debe estar calificado en la construcción de un casquillo y alineamiento apropiados. El cirujano debe estar calificado para actuar como consejero y coordinador en los diversos problemas que pueden presentarse.

Las características principales de este recurso son las siguientes: (1) eliminación de fajas pélvicas, hombreras y casquillos para muñón; (2) control mejor y en consecuencia mayor amplitud de movimiento y mejor marcha; (3) sensación de parte integral del individuo y no de carga para el mismo; (4) menor abultamiento y menor interferencia para el vestido.

RIASSUNTO

Dopo aver osservato e studiato più di 150 casi in cui fu usato uno speciale apparecchio di protesi in pazienti amputati al di sopra del ginocchio, gli Autori convengono con la maggioranza dei competenti in tale campo nel riconoscere che la protesi suddetta presenta numerosi vantaggi ed è quindi assai raccomandabile.

Perchè la protesi possa essere portata utilmente è della massima importanza la collaborazione fra paziente, costruttore dell'apparecchio e chirurgo. Il paziente dev'essere disposto a dedicare tutto il tempo occorrente alle visite di controllo ed alle modifiche dell'apparecchio; il costruttore dev'essere qualificato alla costruzione e alla applicazione della protesi; il chirurgo dev'essere in grado di dare il suo parere nel risolvere e nel coordinare i vari problemi che possono sorgere.

Le principali caratteristiche di questa protesi sono: (1) rende inutili i vari costituenti degli altri apparecchi; (2) è meglio controllabile, permettendo così un più ampio campo d'azione e di movimento; (3) viene avvertita come una parte integrante del paziente e non come un peso morto; (4) è meno massiccia e richiede minori adattamenti nel vestiario.

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Neurosurgical Treatment for Mentally Deficient Children

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NEW YORK

THE problem of the mentally deficient child is a tragic one both to the family and to the community. Occasionally one may see a mentally defective child who appears to be a possible candidate for attempted surgical treatment. I have operated on 4 mentally deficient children, with some interesting observations before, during and after the operation. To classify one of these unfortunates according to the definition set down by the Mental Deficiency Act of Britain in 1913 is ambiguous! "Idiots, imbeciles and feeble-minded persons have these qualities in common: defective mentality, inability to protect themselves against common physical dangers, cannot manage their affairs, and need supervision for protection of their lives and well being.

"The causes of mental defect may be conveniently divided into those operating before, during and after birth. A family history of mental or nervous disease may be obtained. A history of epilepsy in the family is common. Congenital causes, such as consanguinity of parents or alcoholism, infections such as, syphilis and accident are common causes of mental defect in offspring. Prolonged labor or instrumental delivery may cause damage to the cerebral cortex of the child. In endemic cretinism there is a potent geographical cause for cerebral aberration. In the mongolian type, emotional shocks, ill health, frights and worries have been presumed as causes. This type occurs in families in which no history of nervous disorder can be obtained. The affected children often are among the younger members of large families and so uterine abnormality has been put forth as a possible cause.

"The pathology is confined to the skull, the membranes, the brain, or all three. The skull may be large, small, or misshapen. The brain may be lighter, heavier, underdeveloped locally or symmetrically, and in some cases an important part of the brain may be absent.

"In the mongolian type the cerebral cortex is diminished and its structure is less complex than normal. The cerebellum medulla and cord are likewise diminished in size.

"As for symptoms, these unfortunates may range from the mindless to those that can be taught to care for themselves and do simple jobs. Special senses may be diminished, absent, or may not attain perception.

On the other hand, they may be present and functioning within normal limits. Liking, memory, or desire may be absent, or present in varying degree. Walking, standing or sitting up will depend on the degree of cerebration that the infant has attained. Control of bladder and rectum, and self feeding may or may not be taught to the child. Epilepsy is not infrequent.

"In some patients, sexual instincts are developed early and masturbation, genital display, etc., may be indulged quite shamelessly. Temper may be easily aroused and conduct at times may be violent.

"The treatment of this class of patient consists in removal to surroundings where their activities are restrained and the consequence of their actions may be reduced to a minimum of 'bad effect.'"

The foregoing statement may be true in many cases. If it is possible to help some of these patients, then heroic meas-

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*Sharpe, W., and Sharpe, N.: Neurosurgery: Principles, Diagnosis and Treatment. Philadelphia: J. B. Lippincott Company, 1928.

ures are justified. By the same token, surgeons cannot tell whom they can help, until they begin selecting some likely candidates.

The following 4 cases are those of the children operated upon by me.

REPORT OF CASES

CASE 1.—C. M., a girl aged 6½ years, was a twin, the other twin being a normal and healthy boy. The history of C. M. herself was of no great significance except for chickenpox and measles in early childhood. She had weighed 6 pounds and 1 ounce (2,746 Gm.) at birth. So far as the mother knows, she was not delivered by instruments. Labor was prolonged. The patient was born about fifteen minutes in advance of her brother. She sat up before reaching the age of 1 year and walked by the time she was 2 years old.

The child could not talk but could make noises. She understood what was said to her, but only after a statement had been repeated a number of times. She had enough intelligence to be able to attempt to feed herself but actually was not very efficient at it. She was well built for her age but hard to handle; she ran from one object to the next, and neither held her attention for more than a few seconds.

Neurologic examination brought out the following significant data: 1. The skull was smaller than usual and mildly microcephalic, 18½ inches (48.9 cm.) in circumference. 2. The tendon reflexes were exaggerated in all limbs. 3. The Babinski sign was bilaterally positive. 4. The abdominal reflexes were bilaterally absent. Ophthalmoscopic examination was not carried out, because of the difficulty in controlling the patient.

Because of the same difficulty, the parents were anxious to find out whether any operative procedure could in any way make the child more sedate so that she could be cared for at home. The apparent hopelessness of the case was explained to the parents. On their insistence surgical treatment was undertaken, and the following procedure was performed:

Bilateral subtemporal decompression was carried out. At first the brain did not pulsate, but after the dura was opened widely it began to pulsate normally. The skull and the dura were opened on each side to the size of a half dollar. The gyri on the right side were of normal density to the palpating finger; there seemed, however, to be some degree of flattening. On the left, a scar was present on the posterior aspect of the inferior frontal gyrus, extending down to the superior temporal gyrus. It was about the size of a quarter. This scar was excised as a prophylactic measure against jacksonian epilepsy in later life. The dura was left open on both sides. The temporal muscles and skin were repaired in layers.

In the one and one-half years that have elapsed since the operation, this child has shown definite signs of improvement. She is more easily managed; she plays more intelligently, focuses her attention more readily, is attentive for longer periods, and tries to talk. No attempt at determining her psychometric status will be attempted for a few months.

The points that are impressive concerning this case are: (1) that the other twin is normal in every way; (2) that definite pathologic conditions were observed at operation, namely a cerebral scar and a brain under mild pressure, as evidenced by the lack of cerebral pulsation and flattening of the gyri; (3) that the child is more easily managed since the operation; (4) that she is beginning to speak some words, and (5) that, according to the parents, the child's behavior in general shows more intelligence and that her attention can be held for longer periods.

CASE 2.—R. C. T., a boy aged 8 years, was delivered with breech presentation. He had pneumonia at 6 months of age and again at 13 months. A significant occurrence was loss of eyesight for six weeks after the first attack of pneumonia.

The parents' chief complaints were as follows: The child had headaches followed by a convulsive or comatose state. These headaches were accompanied by projectile vomiting. The convulsive seizures had been coming more frequently and during the period immediately before the operation came on at least once a week. The last two attacks were of the nature of status epilepticus, and it was with great difficulty that the seizures were terminated.

The boy could not speak but seemed to understand part of what was said to him. Although more than 8 years old, his size

was that of a child of 3. He could not walk by himself. He would not eat, and hypodermoclyses were often necessary.

Physical examination revealed the boy to be somewhat microcephalic. The skin was coarse. The face showed a tendency toward mongolism. The tongue protruded a great part of the time. The testicles were undescended. The teeth were fissured. Salivation was more profuse than is normal. Walking was accomplished only with help at either arm. The gait was not balanced, and there was a tendency to fall backward. The child did not sit up until he reached the age of 3 years. He was negativistic. He made his wants known by motions, and his family seemed to understand him.

Roentgen examination revealed a small skull with somewhat marked platybasia.

It was my opinion that this child's tendency toward the pituitary-mongoloid type was due to the platybasia. It was also my idea that release of the pressure caused by the platybasia would perhaps relieve the headache and the convulsive state.

Cerebellar decompression was performed. The occipital bone was removed so that both cerebellar hemispheres were completely decompressed. There was no pulsation in the cerebellar area until the dura was opened. The dura was incised in a V shape, on both sides, and left open. After incision of the dura the brain began to pulsate. In the one and one-half years since the operation, the child's headaches have diminished both in frequency and in severity. His epileptic attacks are less frequent, and are of the petit mal type. The patient stands and walks. He is now the size of a 6-year-old child. He is more attentive, is playful, appreciates the humorous incidents that he sees on television, and attempts to talk.

CASE 3.—A girl aged 18 months was slow in teething and showed no signs of intelligence compatible with her age. She showed no signs of being able to see; she would not follow a light with her eyes and showed no pupillary reactions to light. The child had convulsive seizures, of the jacksonian type and involving the left side.

Pneumoencephalographic study showed a picture compatible with that of a subdural cyst on the right side. Craniotomy revealed a subdural cyst the size of a small orange in the right frontotemporo-parietal region. A yellow serous fluid was evacuated.

In the four and one-half months since the operation the child has begun to sit up. She follows the light with her eyes. Her pupils react to light, and she seems happier and more intelligent. There have been convulsive attacks since the operation, but they are infrequent and mild in comparison to the preoperative attacks.

CASE 4.—J. S., a white boy aged 12 months, had been normal until the age of 6 months, when the mother began to notice spasticity and blindness. These symptoms came on shortly after a bout of higher fever. Within the next month or two, the child began having generalized convulsions. The convulsions gradually increased in frequency until there were thirty to sixty generalized convulsive attacks in twenty-four hours.

Examinations revealed the following pertinent facts: 1. The child was normal in height and weight for his age. 2. There was generalized spasticity. 3. There was complete absence of ocular reaction to light, and the optic discs showed marked atrophy. 4. The fontanels of the skull were closed, and microcephaly was marked.

Bilateral craniotomy was performed. Each opening was made from the subtemporal region to within ½ inch (1.2 cm.) of the sagittal sinus, each opening measuring about 2 inches (5 cm.) in width.

There were a few mild convulsions within the first twenty-four hours and none thereafter during the stay in the hospital. The baby began to eat better. His pupils reacted briskly to light; he followed light with his eyes and showed photophobia in strong light.

On follow-up three months after the operation it was learned that the child had had convulsive seizures on only one occasion, while suffering from an infective process accompanied by fever. There has been no other epileptic attack. The child smiles and laughs occasionally. All in all, there is definite improvement since the operation.

CONCLUSION

From both the scientific and the humanitarian standpoint it is the duty of the physician or surgeon to take any means available toward solution of the problem of the mentally defective. When any anatomic abnormality presents itself, one should try to rectify it by surgical means if possible. Physiologic aberrations are often secondary to anatomic abnormalities.

After anatomic difficulty has been overcome at least in part, then only can one hope to attempt physiologic cure or improvement by the use of endocrines, vitamins, diet and psychological training. In 2 of the foregoing cases thyroid therapy was tried for a prolonged period, to no avail. Now, however, since an anatomic barrier to normal physiologic function has been overcome, thyroid therapy may accelerate improvement in these cases. Whether any great change will be seen in the future, no one can tell at present. However, it must be borne in mind that definite improvement has taken place.

Except in those cases in which cerebral agenesis or malgenesis is due to some congenital disease or failure of development, it is the examiner's duty to look for some pathologic factor that may be the cause of a physiologic upset of the brain. Having found some such factor, he should attack it surgically and use his sharpest observation to record the abnormalities that may be observed in the operative area. In this way, perhaps, enough information will be accumulated to help make some of these children less of a source of unhappiness to their families.

SUMMARY

The author reports 4 cases in which mentally defective children were definitely improved by surgical correction of anatomic defects. He emphasizes the surgeon's responsibility to every such child encountered and recommends prompt examination to determine whether an anatomic defect is present and, if so, whether it can be corrected or ameliorated by surgical intervention.

SUMÁRIO

Sob os pontos de vista cientifico e humanitario, é dever da profissão medica procurar solução para o problema da deficiencia mental.

O autor propoe que, quando houver qualquer anomalia anatomica associada, uma tentativa deva ser feita para retifical-a, si possivel. Aberra Pões fisiologicas são muitas vezes secundarias a anomalias anatomicas.

Depois que a dificuldade anatomica tenha sido ultrapassada pelo nenos em parte, pode-se então esperar que a cura fisiologica se produza ou que melhoras por terapeutica endocrinica, vitaminas, dietas, e treinamento fisiologico sejam observados. Em 2 dos casos descritos, terapeutica pela tiroide foi experimentada por um periodo prolongado, embora não calculado.

Depois que a barreira anatomica a função fisiologica normal foi vencida, a terapeutica pela tiroide pode acelerar a melhora em tais casos. Si grande mudança sera observada no futuro, ninquem podera dizer; mas deve ser tido em mente que em todos os casos foi observada definitiva mudança patologica depois, da operação, e que definida melhora foi constatada.

Exceto nos de agenesia cerebral ou malgenesia devida a alguma doença congenita ou fracasso no desenvolvimento, dever-se-ia olhar por outro fator patologico que possa ser a causa da congestão fisiologica do cerebro. Tendo sido descoberto algum de tais fatores, dever-se-a atacal-o cirurgicamente e observar meticulosamente qualquer anomalia que possa existir na area operatoria. E possivel que deste modo bastante informaçãopossa ser ganha para habilitar os cirurgiões a transformar algumas crianças defeituosas em individuos de algum modo uteis a si mesmos e a comunidade e abolir uma fonte de infelicidade para suas familias.

RESUMEN

Es deber de la profesión médica buscar una solución al problema de los mentalmente defectuosos, tanto desde el punto de vista científico como del humanitario. A este respecto, se propone que en habiendo cualquier anomalía anatómica asociada debe intentarse modificarla quirúrgicamente, si esto es posible. Aberraciones fisiológicas son a menudo secundarias a anomalías anatómicas. Después de haber sido vencida la dificultad anatómica, al menos en parte, entonces puede intentarse

la cura fisiológica o el alivio mediante la terapéutica endocrina, vitaminas, dieta y adiestramiento psicológico. En 2 de los casos descritos se instituyó terapéutica tiroidea por un período prolongado, sin resultado. Ahora que se ha vencido una barrera anatómica para la función fisiológica normal, la terapéutica tiroidea puede acelerar el alivio en estos casos. Nadie puede decir por ahora que gran cambio habrá de verse en el futuro, pero debe tenerse presente que an todos los casos se observó un cambio patológico definitivo a la operación y hubo alivio definitivo.

Puede pensarse en la causa de algún factor patológico en un trastorno fisiológico cerebral, excepto en casos de agenesia o malgenesia debida a alguna enfermedad congénita o defecto de desarrollo. Encontrando dicho factor, puede atacarse quirúrgicamente y observar meticulosamente cualquier anomalía que pueda existir en el área operatoria. Es posible que do esta manera pueda obtenerse suficiente información, capacitando a los cirujanos para hacer de algunos niños defectuosos algo útil a sí mismos y a la comunidad, así como disminuyendo en algo la infelicidad en sus familias.

RÉSUMÉ

Tant au point de vue scientifique qu'au point de vue humanitaire, c'est un devoir pour la profession médicale de trouver une solution au problème des aliénés. L'Auteur suggère de corriger, même par des procédés chirurgicaux, tout défaut physique. On rencontre souvent des aberrations physiologiques associées à des anomalies physiques. Seulement après une correction de la difformité physique, peut-on entreprendre la cure physiologique à l'aide de glandes endocrines, de vitamines, de diète et de rééducation phychologique. On a essayé dans deux cas, mais sans succès, le traitement par l'opothérapie thyroidienne. Sans franchir une barrière anatomique, on a quelquefois réussi à l'aide du traitement opóthérapique thyroidien. Sans trop escompter l'avenir, il faut garder à l'esprit l'idée que des changements importants se sont faits, changements confirmés durant l'intervention chirurgicale.

Sauf dans les cas d'agénésie cérébrale ou de malformation secondaire à des lésions cérébrales ou à un défaut de développement, on devrait rechercher la cause pathologique responsable du dérangement cérébral. Quand on l'a trouvée, on doit entreprendre le traitement chirurgical et observer méticuleusement toute anomalie qui peut exister dans le champ opératoire. Il s'ensuivrait alors une source de renseignements utiles qui permettraient au chirurgien de corriger les défauts et de rendre des enfants plus utiles à eux-mêmes en déchargeant la communauté d'un fardeau pénible.

RIASSUNTO

E' preciso compito del medico, sia dal punto di vista scientifico che da quello umanitario, di cercar di risolvere il problema del deficiente.

L'Autore propone che, quando vi sia una alterazione anatomica, si debba tentare di provi rimedio, se è possibile, con mezzi chirurgici. Le alterazioni funzionali sono spesso secondarie ad alterazioni anatomiche. Solo dopo che sia stato posto rimedio, almeno in parte, alle alterazioni anatomiche, si può sperare di curare le alterazioni funzionali con la terapia endocrina, le vitamine, la dieta ed i metodi psicologici.

In due dei casi descritti, una terapia a base di prodotti tiroidei era stata praticata a lungo senza risultati. Tolto un ostacolo anatomico al normale svolgimento della funzione, la terapia tiroidea può rendere più rapido il miglioramento in questi casi. Non si può tuttavia dire, allo stato attuale, se si potrà assistere a ulteriori notevoli mutamenti in futuro; ma bisogna ricordare che in ciascun caso vennero osservate, all'intervento, chiare alterazioni patologiche e che seguì un indubbio miglioramento.

Eccettuati i casi di agenesia o di mal-

formazione cerebrale dovute a malattie congenite o a difetti di sviluppo, si debbono sempre ricercare alcuni fattori patologici che talvolta possono essere la causa di disturbi funzionali del cervello. Una volta che qualcuno di tali fattori sia stato identificato, occorre aggredirlo chirurgicamente e ricercare attentamente ogni alterazione che possa esistere nella zona scoperta operatoriamente. In tal modo è possibile che il chirurgo acquisti nozioni sufficienti da permettergli di rendere alcuni bimbi deficienti un poco più utili e se stessi e alla comunità e un po' meno fonte di infelicità alle loro famiglie.

ZUSAMMENFASSUNG

Sowohl vom wissenschaftlichen als auch vom menschlichen Standpunkte aus gehoert es zu den Pflichten der Aerzteschaft, sich nach einer Loesung des Problems der Geisteskranken umzuschauen.

Der Verfasser schlaegt vor, in Faellen, wo eine anatomische Abnormalitaet vorliegt, wenn irgend moeglich den Versuch einer chirurgischen Korrektur zu unternehmen. Physiologische Abweichungen sind oft die Folgen anatomischer Veraenderungen. Nur wenn die antomische Stoerung wenigstens teilweise beseitigt ist, darf man hoffen, eine Heilung oder Besserung der physiologischen Veraenderungen mittels endokriner Behandlung, mit Vitaminen, Diaet und psychologischen Uebungen zu erreichen. In zwei der beschriebenen Faelle wurde eine Schilddruesenbehandlung ueber einen laengeren Zeitraum ohne Erfolg versucht. Jetzt, nachdem eine anatomische Behinderung der physiologischen Funktion beseitigt wurde, hat eine Schilddruesenbehandlung die Moeglichkeit, in diesen Faellen eine Besserung zu beschleunigen. Ob sich in der Zukunft eine grosse Veraenderung zeigen wird, kann man noch nicht sagen; man darf aber nicht vergessen, dass in allen Faellen waehrend der Operation sichere pathologische Veraenderungen beobachtet wurden, und dass eine deutliche Besserung eingetreten ist.

Abgesehen von Faellen mit fehlender odor mangelhafter Anlage des Gehirns infolge angeborener Erkankungen oder Entwicklungsstoerungen soll man nach einem pathologischen Faktor, der die Ursache fuer eine physiologische Hirnstoerung bilden koennte, suchen. Findet man einen solchen, so soll man ihn chirurgisch angehen und sorfaeltig alle moeglicherweise existierenden Abnormalitaeten im Operationsgebiet beobachten. Auf diese Weise mag der Chirurg Informationen gewinnen die Ausreichen um manche erkrankte Kinder wenigstens einigermasser tauglich fuer sich selbst und die Allgemeinheit zu machen und ihren Beitrag zu den Kuemmernissen innerhalb der Familie zu vermindern.

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Nonpenetrating Traumatic Rupture of the Liver

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NONPENETRATING traumatic rupture of the liver is not frequently encountered in civilian practice. Only 9 cases have been observed at the Cook County Hospital in Chicago during the past ten years. Various figures have been given to represent the mortality percentage following such an injury. Sanders, MacGuire and Moore stated that the overall mortality rate of liver rupture in general is around 60 per cent, that of the massively ruptured liver being much higher. Mikals and Papen stated in the series they reported, regardless of the type of treatment employed for hepatic injuries, the mortality rate was 62.5 per cent. They stated further that if operation is performed later than three hours after the injury the mortality rate rises to 66 per cent.

The following case report discribes a massive rupture of the liver resulting from approximately 5,000 pounds of metal tubing falling on the patient.

REPORT OF CASE

Mr. J. D., aged 32, was admitted to the hospital at 4 p.m. on March 23, 1951. He stated that a large amount of steel tubing had fallen on his back about one hour prior to his admission. It was subsequently found that the tubing weighed approximately 5,000 pounds. His chief complaints were severe pain in his left wrist and in the right upper quadrant of the abdomen. The blood pressure in millimeters of mercury was 175 systolic and 90 diastolic. The temperature was 100 F. and the pulse rate 86.

The patient was seen by one of us (S.T.) at 6 p.m., two hours after the injury, at which time examination revealed a comminuted fracture of the left wrist, some contusions of both legs and tenderness in the right upper quadrant of the abdomen. At this time the blood pressure in millimeters of mercury was 80 systolic and 60 diastolic. There were 4,130,000 erythrocytes and 18,000 leukocytes per cubic millimeter of blood. The value for hemoglobin was 77 per cent. The hematocrit reading was 48 per cent.

The fractured wrist was reduced and a cast applied. At 7:30 p.m. the patient was given 500 cc. of whole blood. At 9 p.m., 1,000 cc. of 5 per cent dextrose in water was started. He also was given tetanus antitoxin and 400,000 units of duracillin.

Because of pain in the upper part of the abdomen the patient was seen by one of us (J. M. G.) at 12:30 a.m. approximately nine hours after the injury. There was no evidence of injury to the abdominal wall or to the back. There was tenderness and some rigidity in the right upper quadrant of the abdomen. Some tenderness was also noted in the region of a distended urinary bladder. Bowel sounds and liver dullness were present, and there was no evidence of fluid in the abdominal cavity. Rectal examination revealed no abnormal conditions. The blood pressure in millimeters of mercury was 120 systolic and 70 diastolic. The pulse rate was 90, and the patient did not appear to be in shock. The urinary bladder was catheterized and 350 cc. of normal urine obtained, with relief of the pain in the lower part of the abdomen.

A tentative diagnosis of injury to the liver without any intra-abdominal hemorrhage was made and conservative treatment advised. Wangensteen suction was instituted, and 500 cc. of whole blood and 1,000 cc. of 5 per cent dextrose in water were ordered for the morning. A scout film taken in the morning was reported as revealing no intra-abdominal pathologic change.

The patient was seen again about forty-three hours after the injury. The blood pressure in millimeters of mercury was 140 systolic and 70 diastolic. There were 3,584,000 red cells and 10,350 white cells per cubic millimeter

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of blood. The value for hemoglobin was 67 per cent. Tenderness and some rigidity were still present in the right upper quadrant of the abdomen. Liver dullness was present. Bowel sounds were slightly exaggerated, and tingling sounds were heard. There was no evidence of intra-abdominal fluid, and rectal examination gave negative results. A second scout film of the abdomen showed accumulation of gas in several loops of small intestine without signs of pathologic distention, no fluid levels and no abnormalities referable to the liver or the spleen.

The patient was seen again approximately forty-eight hours after the injury. There was a marked change in his condition. Severe rigidity, distention and rebound tenderness were present over the entire abdomen. Bowel sounds were absent. The temperature had risen to 101 F.; the pulse rate was 112, the respiratory rate 18. The blood pressure was 90 systolic and 60 diastolic. The red blood cell count was 3,616,000 per cubic millimeter, with 67 per cent hemoglobin.

A diagnosis of ruptured liver with secondary hemorrhage was made and immediate operation advised. Operation was performed with the patient under pentothal sodium anesthesia, C_3H_6 plus oxygen and curare. A high right rectus incision was made. The peritoneum looked dark blue, and when the peritoneal cavity was opened approximately 2,000 cc. of fresh blood, containing some clots, was removed.

Exploration of the abdomen revealed a large tear in the right lobe of the liver, just to the left of the gallbladder. The liver was cut across, except posteriorly, where it was held by the hepatic capsule. About 3 inches (7.5 cm.) separated the cut edges. The gallbladder was intact and normal. There was no evidence of injury elsewhere in the abdominal cavity.

The liver was situated high underneath the ribs, and suture of the rent, even if it had been desired, could not be done unless the original incision were extended into the chest cavity, which was not deemed advisable. Because of the large tear present and the wide separation of the edges, we were skeptical about the use of gelfoam to stop the bleeding, and it was decided to pack the wound with gauze.

About 19 feet of uterine packing was placed in the tear, with immediate cessation of bleeding. The abdominal wall was closed in layers, and the gauze drain was left protruding from the upper end of the incision.

During the operation the patient received 500 cc. of whole blood and 1,000 cc. of physiologic solution of sodium chloride. He was returned to his bed in a fair condition.

Postoperative treatment consisted of the use of Wangensteen suction, whole blood, amigen, dextrose, saline, vitamins, potassium chloride, narcotics and oxygen. He further received 400,000 units of duracillin and 0.5 Gm. of streptomycin twice a day. A total of 3,000 cc. of fluid was given intravenously daily. Much difficulty was encountered in keeping the blood picture and the electrolytes in balance.

During the first three postoperative days the rectal temperature fluctuated between 100 and 102 F. There was much drainage of bile through the gauze pack. On the third postoperative day the patient passed flatus per rectum; his abdomen became soft, and bowel sounds were heard.

On the fourth postoperative day a stormy period began. The rectal temperature rose to 103 F.; the pulse rate was 140 and respiratory rate 24. Rales were heard throughout the chest. Edema of the ankles and feet appeared. The medical consultant's impressions were pneumonitis of the right lower pulmonary lobe and probably of the left base; acute toxemia from liver injury and subsequent absorption of toxic material with early pulmonary edema. A roentgen report was as follows: "A film of the chest taken in the posterior-anterior view disclosed a uniform dense consolidation of the right lower lobe, with accumulation of fluid at the right base. Both upper lung fields showed numerous patchy, ill-defined densities evidently representing lobular pneumonia consolidation. The left side of the diaphragm and the costophrenic angle are clear."

In addition to the other antibiotics, 500 mg. of aureomycin was administered intravenously daily. Because of the edema of the ankles and feet and the fluid in the chest, the daily intravenous fluids were decreased from 3,000 to 1,200 cc., and within a few days the edema was gone and the pulmonary conditions greatly improved.

For eight days the patient was semicomatose. One night he got out of bed and broke the window of his room.

Wangensteen suction was discontinued on the tenth postoperative day, and fluids by mouth were started and rapidly increased. On

Laboratory Report

	3/24/51	4/2/51	4/26/51	5/1/51	7/31/51
Blood chlorides	440 mg.%	460 mg.%			
Total proteins	4.4	5.6	6.9		6.3
Albumin	3.4	3.0	3.9		3.8
Globulin	1.1	2.6	3.0		2.5
Blood sugar			110 mg.%		
Cholesterol			150		246
Cholesterol esters			121		163
Prothrombin				100%	100%
Blood nonprotein nitrogen				26 mg.%	
Creatinin				1.0%	
Urea nitrogen				11 mg.%	
Bilirubin				0.7 mg.%	0.3 mg.%
Cephalin flocculation				4+	Neg.

the twelfth postoperative day all intravenous fluids were stopped. Gradual improvement of the patient then began. On the thirteenth postoperative day, with the patient under pentothal sodium anesthesia, 5 feet of packing was removed by constant twisting and gentle traction on the pack.

On the fifteenth postoperative day the lungs were normal. An additional 6 feet m. of packing was removed on this day, with the patient anesthetized, and the remainder of the pack, also with the patient anesthetized, was removed on the eighteenth postoperative day.

The patient was discharged from the hospital fifty-two days after the operation. Biliary drainage continued for 103 days (July 6, 1951). At no time was there any bleeding from the wound.

At the time of this writing it has been fifteen months since the biliary drainage ceased. The patient has regained most of his former weight and has no complaints referable to the abdomen or the gastrointestinal tract.

The cast on the left wrist was removed seven weeks after its application, and roentgen examination shows a normal left wrist.

RIASSUNTO

Viene riferito un caso di rottura traumatica del fegato con emorragia intracapsulare che sembrò arrestarsi dopo qualche ora dal trauma e che riprese fra la 43ma e la 48ma ora più tardi.

La lacerazione aveva separato quasi completamente il lobo destro del fegato. L'emorragia fu arrestata per mezzo di un tampone uterino di 19 piedi sistemato nello strappo. Vi fu drenaggio biliare per 103 giorni dopo l'operazione, ma si ottenne una guarigione completa con ritorno alla norma delle funzioni del fegato.

SUMMARY

A case of nonpenetrating traumatic rupture of the liver with some intracapsular bleeding which apparently ceased a few hours after the injury, with recurrence of the bleeding between the forty-third and forty-eighth hour after the injury, is reported. The tear almost completely severed the right lobe of the liver. The bleeding was stopped by means of 19 feet of uterine pack placed in the tear. Biliary drainage continued for one hundred and three days after the operation. Recovery was complete, with normal return of liver function.

SUMARIO

E relatado um caso de rotura traumatica não penetrante do figado com certo gran de hemorragia intracapsular, a qual aparentemente cessara algumas horas depois do trauma, com recurrencia da hemorragia entre 43 e 48 horas apos o acidents. O golpe dialceron quasi completamente o lobo direito do figado. A hemorragia cessou por meio de tam-

ponamento com 6 metros de gaze, usada para tamponamento uterino, colocados na dilaceração. A drenagem biliar continuon por cento e tres dias depois da operação. O restabelecimento foi completo com retôrno ao funcionamento normal do figado.

RESUMEN

Se comunica un caso de ruptura traumática no penetrante del hígado, con alguna hemorragia intracapsular, que cesó aparentemente unas cuantas horas después de la lesión y recidivó de 43 a 48 horas después de la misma. La ruptura lesionó casi completamente el lóbulo derecho del hígado. Se cohibió la hemorragia por taponamiento. Se mantuvo canalización biliar 103 días después de la operación. Recuperación completa con función hepática normal.

ZUSAMMENFASSUNG

Es wird der Fall eines stumpfen traumatischen Leberrisses mit intrakapsulaerer Blutung berichtet. Die Blutung kam offenbar einige Stunden nach der Verletzung zum Stillstand und trat zwischen der 43sten and 48sten Stunde nach der Verletzung wieder auf. Der Riss fuehrte zu einer fast voelligen Spaltung des rechten Leberlappens. Blutstillung erfolgte durch Einlegen eines sechs Meter langen Gebaermuttertampons in den Riss. Fuer 103 Tage nach der Operation bestand ununterbrochen Gallendrainage; schliesslich trat voellige Heilung mit Rueckkehr normaler Leberfunktion ein.

RÉSUMÉ

L'auteur rapporte un cas de rupture traumatique du foie sans pénétration de l'organe; cependant, il y avait une hémorragie intracapsulaire qui a cessé quelques heures après l'accident pour reprendre entre la 43 et 48e heure après l'accident. La déchirure intéressait presque la totalité du lobe droit du foie. L'hémorragie fut controlée à l'aide de 19 pieds de gaze pour paquetage utérin. Le drainage biliaire s'est continué pendant 103 jours après l'opération. La guérison fut complète et le foie repris sa fonction normale.

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Rehabilitation of the Child With Cerebral Palsy

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CEREBRAL palsy, formerly known as spastic paralysis or Little's disease, is now recognized as one of the most consistent causes of crippling in children. Another ruthless attacker of children, poliomyelitis, may be considered the only more frequent cause. Now, with the vast organized resources available for the treatment of children afflicted with this dreaded disease, permanent residual deformities consequent upon infantile paralysis are generally milder. Cerebral palsy, then, remains the great crippler of children, persistent in its ratio to the population and heedless of all economic, geographic, social, educational and racial boundaries. It has recently been estimated that 0.5 per cent of all live births produce a child with cerebral palsy. Of the utmost significance, too, is the fact that careful sampling by t r a i n e d teams throughout the United States has revealed a constant annual increase of 7 new victims per 100,000 of the population. It is this constant increase each year that, unlike the sporadic epidemics of poliomyelitis, leaves no reason for hope that cerebral palsy will soon be conquered. In this great area of advance in the preservation and rehabilitation of the stricken child, cerebral palsy has remained as the most neglected handicap in children. Since 1938, when the studies of McIntire[1] proved that, contrary to general scientific belief, children with cerebral palsy are not all feebleminded—that, in fact, more than two-thirds of these handicapped children are educable—the responsibility of the medical profession to rehabilitate these "forgotten" children has been singularly clear. The conscience of our time has now, as in the past, reminded us that to let live but to refuse to rehabilitate is not consistent with the American way of life. Rehabilitation facilities for children with cerebral palsy are now being established at a steadily increasing rate. If these children are to be restored to a rightfully useful place in society, there must be a clear understanding of the nature of their condition.

What, then, is cerebral palsy? The term is a general one, designating any paralysis, weakness, incoordination or functional deviation of the motor system resulting from an intracranial lesion.[2] Since the brain is the center not only of muscle control but of intelligence, behavior control, personality and many other functions, it is possible for brain injury to result in convulsions, motor paralysis of the extremities, mental deficiency, personality problems or sensory disturbances (such as loss of hearing and visual defects) depending on the location of the lesion and the degree of involvement. Cerebral palsy, then, presents a complex clinical entity with multiple handicaps.

Phelps[3] classified the condition into five distinct clinical types, based on the predominant motor handicap: (1) true cerebral spastic paralysis (20 per cent); (2) athetosis (40 per cent); (3) rigidity (20 per cent); (4) ataxia 10 per cent), and (5) tremor (5 per cent). In the child with true spasticity the characteristic signs are hyperirritability, hypercontractility and hypertonia of the muscles involved. These muscles exhibit the physiologic phenomenon described by Liddell and Sherrington[4] as the "stretch reflex," in which contraction of the antagonist muscle (for example, the hamstring muscles in flexing the knee joint) produces stretching of the hypercontractile muscle (the quadriceps in this case),

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causing it to contract and block voluntary motion to flex the knee. The quadriceps is then said to be spastic. The deep tendon reflexes are hyperactive and clonus may be present, the clonus representing an exaggeration of the stretch reflex. Because of the location of the lesion, which usually involves both Area 4 and Area 6 (Fulton[5]) of the motor cortex, one may observe a combination of muscular dysfunction, with spastic muscles, flaccid muscles and normal muscles in the same patient. This combined dysfunction causes the imbalance of muscle power that handicaps the spastic child.

The athetoid child differs in that his handicap is due to involuntary motions of no constant pattern which attempt to move joints rather than individual muscles. The pathologic change here is in the cells of the basal ganglions of the midbrain, the putamen, the caudate nucleus and the tegmental nucleus, which results in an abnormal release of impulses from the motor cortex. The braking mechanism for this steady stream of impulses from the motor cortex fails, and involuntary movements occur—rapid or slow, constant or intermittent — which usually disappear during sleep. The constant grimacing and facial distortion of the athetoid child has, in the past, led to an incorrect diagnosis of mental retardation.

The ataxic child shows disturbance or loss of kinesthetic sense and balance. He walks with a wide base and has considerable muscular hypotonicity, which retards walking. The speech may be thick and dragging. There is often an associated nystagmus. The possibility for spontaneous motor improvement is better for children with this type of cerebral palsy than for children affected with any other type.

The child with "rigidity" presents a loss of tonus or elasticity in the muscles, which give a "plastic" or "lead pipe" response to passive motion of a joint. There is no true stretch reflex in the muscles. The rigidity may be intermittent or constant. Because of the extensive lesion present in this condition, namely, multiple petechial hemorrhages in the cerebral cortex, the incidence of mental retardation in this group is high.

Tremors may be of the intention or of the nonintention type and are characterized by involuntary motions that are reciprocal and are also regular in rhythm. The lesion is usually a hemorrhage in the tegmental nucleus or in other elements of the basal ganglions.

What causes cerebral palsy? Since 1862, when Little[6] described a microcephalic idiot with spastic diplegia, trauma during birth has been considered the principal etiologic agent. Modern statistics, such as those of Ford,[7] ascribing 6 per cent of all instances of cerebral palsy to birth trauma, and those of Phelps, attributing only 3 per cent to this cause, have refuted this misleading doctrine. Defective prenatal development is the commonest offender, especially in the ataxic and athetoid child. Other important prenatal factors are (1) rubella during the first trimester of pregnancy; (2) the toxemias of pregnancy; (3) premature separation of the placenta, and (4) endocrine dysfunction. When there is symmetry of involvement, such as bilaterally equal involvement of the arms or legs, one should suspect a prenatal or congenital background. In fact, congenital athetosis often causes a most difficult labor, and the postnatal physical handicap is falsely attributed to the difficult labor.

So-called birth injuries are usually of two types: those resulting from direct mechanical injury and those following prolonged lack of oxygen. Mechanical injury may be due to incorrect application of forceps, failure to apply forceps in protracted labor, excessive traction on the head and, most important, prematurity. In cases of prematurity the intracranial birth hemorrhage is due to rupture of the delicate blood vessels by the sudden drop from the high intrauterine pressure to atmospheric pressure during a precipitous delivery. This hemorrhage

is usually a small one beneath the anterior fontanel and produces characteristic spastic diplegia. Cerebral anoxia is a frequent causal factor—the injudicious use of analgesic and anesthetic agents in the second stage of labor, passive congestion of the fetal brain occurring as a result of the umbilical cord being wrapped around the neck of the fetus, or a short period of fetal apnea, will produce anoxia of the brain and intercellular damage.

In the postnatal group of injuries, severe jaundice occurring during the first weeks of life, associated with arythroblastosis foetalis and disturbances of the Rh factor, will frequently result in damage to the basal ganglia, with the development of athetosis. Fractures of the skull with cortical damage, severe convulsive seizures, whooping cough and postexanthematous encephalitis are other common offenders in the production of cerebral palsy.

With adequate treatment and training, children with cerebral palsy can and do improve physically, mentally and socially. The actual damage to nerve tissue, of course, is irreversible and permanent. The proof of the surprising capacity of these children for improvement was first demonstrated by Phelps and McIntire at the Babbitt Hospital in Vineland, New Jersey. Twenty boys of normal mentality from 5 to 15 years of age, with cerebral palsy, were given a medically prescribed and supervised course of rehabilitation for almost six years. On entrance to the hospital only 30 per cent of this group were capable of attending the regular public schools. On discharge this proportion had grown to the amazing figure of 77 per cent. The rate of social maturation of the children was about three times as rapid after the course of training as it had been before. The results of this important experiment have since been confirmed many times in outpatient clinics as well as in hospital-school units.

The first step in the rehabilitation of the child with cerebral palsy, as with any patient, is an accurate diagnosis. The child must be classified according to the type of cerebral palsy he has, and his neuromuscular picture must be evaluated. In addition to involvement of the extremities, defects of speech, hearing and vision must be appraised. In some surveys of children with cerebral palsy, 60 per cent have shown associated speech defects. Speech defects in the spastic child are due primarily to spasticity of the muscles of the larynx, pharynx, tongue and lips. In the athetoid patient, involuntary movements of the diaphragm, which interfere with breath control, may add to the speech handicap. Hearing defects, especially in the athetoid child, are often selective impairments for certain ranges of pitch—the *s*, *t*, *th* and *f* sounds—and require special management. Visual defects include not only abnormal vision but loss of control of the extraocular muscles, resulting in convergent squint and nystagmus. Seizures of both the grand mal and the petit mal type occur more frequently in the child with cerebral palsy than in the normal child, and must be controlled effectively to avoid serious mental retardation.

The mental ability of the child must also be evaluated. This procedure is fraught with many possibilities of error for the child. Satisfactory testing with standard tests is of value only when the psychologist knows in advance the motor, speech, visual and hearing handicaps of the child. Most of the tests for grading intelligence assume that a normal motor mechanism exists, and the score depends, for the most part, on the rapidity of the motor response and the existing communication facilities. To try to evaluate the mental ability of a child who has no means of rapid response, who is unable to talk, write or use his hands in any coordinated manner, is a difficult task. It is no wonder, then, that until recently all children with cerebral palsy were considered mentally retarded. In addition to the lack of speech and motor coordination, these children suffer from lack of the environmental stimulation necessary to normal mental development; this holds true for all "shut-in" or home-bound chil-

dren. This group is spoken of as being "retarded by deprivation".

To complete the picture, the social maturation level and the emotional background of the child must also be evaluated by a psychologist.

The first task, then, in the rehabilitation of the child with cerebral palsy is evaluation. Each child presents an individual problem, and the problems occur in infinite variations. It is only after these preliminary screenings, in which the clinical diagnosis, the neuromuscular picture, the assessment of associated handicaps and psychologic examinations are completed, that one can map out an adequate plan of treatment.

The aims of rehabilitation treatment revolve about four main objectives: (1) locomotion, (2) speech, (3) self-help (arm skills) and (4) education.

The first objective, in general, is to teach the child to walk. Braces are used to support weak muscles (as in poliomyelitis), to prevent contractures and, chiefly, to overcome the pull of undesired muscle contraction or joint motion. Many of the children have no concept whatever of the walking process—often it takes months to train them in the pattern of putting one leg in front of the other. It is done by conditioning exercises, much as in learning to play the piano. Once the automatic phase is learned, the child is trained to improvise—to walk without his braces or crutches. These technics are carried out by trained physical therapists by a process similar to the muscle re-education regime in the treatment of patients with residual paralysis of poliomyelitis. A variety of equipment is available to help the child achieve the ultimate goal of walking independently without support. The method of training is patterned after the maturation process of the normal child, who usually pulls himself up at 3 to 6 months, sits up at 6 months, crawls at 9 months, walks at 12 months and talks at approximately 18 months. This pattern is followed by training the child first to sit; then to kneel; then to stand and, finally, to walk.

Occupational therapists teach the children the skilled arm and hand movements necessary for feeding, dressing and general self-sufficiency. Speech therapy is in the hands of specially trained therapists who train the muscles of the diaphragm, tongue, larynx, pharynx and lips.

Surgical procedures on the brain and spinal cord have not proved to be of any general help. Surgical treatment of the extremities[8] is of value in selected cases, and its use is generally reserved for late adolescence, when maximum longitudinal bony growth has been achieved. Many contractures can be avoided by the wearing of simple day or night braces. Drugs, such as neostigmine, atropine, curare and mephenesin, are of assistance only as adjuvants to the physical therapy program. What is required in achieving the four objectives of treatment is intensive practice, sheer perseverence and sympathetic training by skilled hands.

Every normally intelligent child with cerebral palsy is entitled to an academic education. A large percentage of the children go to regular public schools—particularly hemiplegic children and some of those with mild athetoid or spastic paralysis. They hold their own very well. It is important that the field of special education be widened so that more teachers will be available who have special knowledge of teaching methods for the handicapped child. Special schools for handicapped children—clinic schools and hospital schools—should be established for children of normal intelligence with cerebral palsy.

The responsibility for neglect of the child with cerebral palsy rests firmly on the uninterested practitioner. The tragedy of neglect of these handicapped children is not among those who are mentally retarded but in the majority with normal or superior intelligence—sensitive children, possessed of normal ambitions, desires and capacity for affection. It is incumbent upon us, the profession, then, to rehabilitate them and restore these unfortunate children to their rightful places in society.

SUMMARY

The author discusses cerebral palsy in children, emphasizing the fallacy of the long-held belief that such children are always mentally defective. It has been proved that this is by no means true of the majority. Strong emphasis is laid on the possibility and necessity of rehabilitating these children so as to restore their potentialities for normal and useful life and service to society.

RÉSUMÉ

L'auteur discute de la paralysie cérébrale de l'enfant, trop longtemps considérée à tort comme une déficience intellectuelle. Ceci est faux dans la plupart des cas. L'auteur insiste sur la nécessité et la possibilité de réhabiliter ces enfants afin de leur donner leur place dans la vie et dans la société.

ZUSAMMENFASSUNG

Der Verfasser eroertert die zerebrale Kinderlaehmung und betont die Irrigkeit der lange vorherrschenden Annahme, dass solche Kinder immer geistig zurueckgeblieben seien. Es hat sich erwiesen, dass dies fuer die Mehrzahl der Faelle keineswegs zutrifft. Auf die Moeglichkeit und Notwendigkeit, die Kinder soweit herzustellen, dass sie ein normales und nuetzliches Leben fuehren koennen, wird mit Nachdruck hingewiesen.

RESUMEN

Se discute la parálisis cerebral en los niños, señalando la falacia de la vieja creencia de que muchos de ellos son siempre mentalmente deficientes. Se ha probado que esto no es verdad en la mayoría de los mismos. Se insiste firmemente en la posibilidad y necesidad de rehabilitar a dichos niños, así como restaurar su potencialidad para una vida normal y útil a la sociedad.

RIASSUNTO

L'Autore discute la paralisi cerebrale nei bambini, sottolineando la fallacia della credenza secondo cui tali bimbi siano sempre dei minorati mentali. E' stato dimostrato che ciò non è affatto vero nella maggior parte dei casi. L'A. inoltre afferma la necessità di riabilitare tali bambini in modo da ristabilire la loro potenzialità per una normale e utile vita nella societa.

SUMARIO

O augor discute a paralisia cerebral em crianças, realçando a falsidade da crença de longa data de que tais crianças são mentalmente defeituosas. Tem sido provado que isto não é verdadeiro na maioria dos casos. Forte realce é posto na possibilidade e necessidade de reabilitar estas crianças de forma a restaurar sua potencialidade ao normal e a vida util bem como aos serviços sociais.

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Hemorrhoids: A Geriatric Problem at Any Age

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IN every field of endeavor there arrives a time when it seems appropriate to make a critical examination of certain concepts and beliefs that have long been taken for granted. To my mind, the hazy obscurity surrounding the causation of hemorrhoids should be cleared away, since the accepted theories as to their cause can no longer be considered adequate. This contribution is offered as a solution of the etiologic problem involved, or, falling short of this, as a means of eliminating some of the obscurity surrounding the subject.

To begin with fundamentals, a brief restatement of the histologic picture of normal hemorrhoidal veins may afford a sound point of departure.

Normal Elements of Strength.—The walls of the hemorrhoidal veins are similar in structural detail to those of most other veins, except for the fact that they are devoid of valves. However, like other veins, they have three layers.

1. The tunica intima, which lines the vein with endothelial cells supported by a scant amount of fine connective tissue and a meagre amount of elastic tissue arranged longitudinally.

2. The tunica media, which contains an appreciable amount of smooth muscle tissue and considerable connective tissue.

3. The tunica externa, which is composed of fibers of white connective tissue, elastic tissue and some muscle tissue, though a lesser amount of the muscular element than is present in the tunica media.

Since the object of the present research is an explanation of the *weakness* in the walls of the hemorrhoidal veins in the presence of disease, it would be well to examine the elements of *strength* in the normal venous wall. It will be readily agreed that the greatest element of strength lies in the tone of the muscular layer of the medial coat. This is supplemented to some extent by the lesser muscular fibers in the external coat. Certainly no great element of strength can be found in the scant connective tissue or meagre elastic tissue; whatever strength exists there is passive. The chief factor, therefore, on which the normal size and shape of the hemorrhoidal veins depend, is *the tone of the muscle fibers* scattered throughout its walls. I consider this a fact of primary importance.

There is, however, another muscle accessory to rectal and anal function to which I call attention pointedly, namely, the levator ani. This muscle keeps the viscera from pressing directly upon the anorectal wall and its contained vessels. It is well to bear in mind also that this is the muscle which during defecation draws the anus upward over the fecal mass and so assists in its expulsion.

Changes from Strength to Weakness.—Turning from the normal to the pathologic picture in the presence of hemorrhoids, one observes the following histologic changes:

"In practically all hemorrhoids that I have examined, there has been marked atrophy of both the adventitia and the media, with variable degrees of replacement of smooth muscle fibers by connective tissue. The media may actually be thickened and thus give the appearance of hypertrophy, but close inspection, particularly of sections stained with picrofuchsin or van Gieson's stains, will reveal the fact that the apparent thickening is in truth a degenerative process in which the smooth muscle fibers have to a varying degree been replaced by connective tissue fibers and that in many cases these

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have become hyalinized. Indeed, the amount of smooth muscle fibers is at times reduced to an almost negligible quantity.* The endothelium is in the main unaltered."

Atrophy of the venous wall is the histologic background for the venous dilatation. When judged on the basis of these pathologic observations, it can be seen as essentially a vascular degenerative process. The changes in the overlying mucosa and, to a greater degree, in the underlying submucous areolar tissue are secondary. Early in hemorrhoid formation the process consists of a simple dilation of the wall of the vein. Later it is complicated by secondary mechanical changes, such as those associated with thrombosis or prolapse, or by changes due to injection, such as chronic productive inflammation or ulceration.

The foregoing observations are identical with those of other proctologists who have investigated the microscopic structure of hemorrhoids.

These in the main are pathologic data. It will be noted that they are all *retrogressive* changes—changes associated with the aging or dying process. What has brought about such a state of affairs? Why should the hemorrhoidal veins show signs of decadence before any such signs appear in the other structures of the body?

The Cause of the Changes.—Now as to the leading theories usually advanced in explanation of hemorrhoid formation: Early workers in the field of proctology have sought to explain hemorrhoids by pointing out that the hemorrhoidal veins have no valves. According to this theory of hydrostatics, in the upright position the pressure of the column of blood between the skin of the anus and the liver causes the hemorrhoidal veins to dilate and become varicose.

This theory is hardly tenable when one considers the fact that, although everyone walks more or less erectly, not everyone becomes a victim of this condition. Furthermore, domestic animals, such as dogs and cats, not infrequently have hemorrhoids. In their cases the factor of the upright position does not exist.

The fallacy of the no-valve theory becomes still further apparent when one considers the fact that throughout the body there are *many* small veins, of the size of hemorrhoidal veins, which are equally deficient in valves. Not only that, but the entire portal vein and all its branches are devoid of valves. Similarly, the azygos, the venae cavae and the cerebral veins are equally deficient in this respect, yet the fact remains that no conditions analagous to hemorrhoids develops in these regions.

On the other hand, there are at least three veins—the esophageal, the spermatic and the saphenous—which are admittedly supplied with valves and in which varicosities similar to those occurring in the hemorrhoidal veins *do* develop. All of these veins, as is well known, are susceptible to varicosities.

From the foregoing data it is safe to conclude that neither the erect posture nor the deficiency of valves in the hemorrhoidal veins is a primary causative factor in the production of hemorrhoids. Further search must be made for the truly basic cause.

The elements of strength with which the body and its hemorrhoidal veins were endowed at birth are unaltered by either of these factors. If, however, it could be proved that certain things do impair that structural strength, this would provide the first clue as to the true cause of hemorrhoid formation.

The pathologic studies aforementioned definitely show that primary impairment arises from retrogressive changes in the smooth muscle tissue. These are, in the majority of cases, the degenerative changes of oncoming senility.

When such retrogressive changes have occurred in the hemorrhoidal veins, the strength of the venous wall is markedly lessened and becomes easy prey to the various known exciting causes. Loss of muscular tone is therefore *the primary cause* of hemorrhoid formation. Other factors, though admittedly they may

* Montague, J. F.: The Modern Treatment of Hemorrhoids, 3d ed.

precipitate hemorrhoid formation are secondary in importance, since their occurrence is incidental to the life of the particular patient.

Specifically, any mechanical interference with the return flow from the hemorrhoidal area increases pressure there, and the wall of the vein, weakened by loss of muscular tone, becomes elongated, contorted and dilated. In some cases a failing heart, with consequent portal congestion, is the exciting factor; in others, cirrhosis of the liver induces the condition. In still others, increased intra-abdominal pressure due to obese organs, the weight of a gravid uterus or the straining that accompanies a chronic cough, constipation, diarrhea or bladder obstruction is the active factor.

All factors have one element in common —they all induce abnormal slowing of the blood stream in the hemorrhoidal area. This tends to produce thrombosis and often thrombophlebitis in these veins. Edema and hemorrhagic infiltration occur in the later stages. Such veins are particularly liable to infection, and the result is infective thrombophlebitis. It is readily understood, however, that such a sequel is secondary and not primary to hemorrhoid formation. I make this point to invalidate the theory that hemorrhoids are caused primarily by infective phlebitis. In my opinion the hemorrhoidal changes are present before the phlebitis occurs.

All the conditions mentioned as factors tending to produce hemorrhoids have another factor in common. They tend to increase pressure on the pelvic floor. While the levator ani is unimpaired in tone, it is capable of preventing even an increased abdominal pressure from having its full effect upon the hemorrhoidal veins; but, in the presence of a levator ani that has lost its normal tone, the increased intra-abdominal pressure becomes an active factor in hemorrhoidal obstruction.

Not only does atony of the levator ani thus expose the hemorrhoidal area to disorder, but the muscle itself becomes less efficient in expulsion of the fecal mass. This gives rise to the classic complaint of constipation and its certain though sad sequel—the employment of irritating cathartics or laxatives.

As was pointed out in detail by Buie, there is an important additional feature of trauma imposed by infection of the venous walls (e.g., phlebitis). There is no doubt that phlebitis is instrumental in weakening the walls of the veins still further and extending the varicose process, but my own observations indicate that this is of secondary rather than primary importance.

Hypothesis of Hemorrhoid Formation. —To recapitulate, the pathologic-physiologic causes of hemorrhoid formation, according to my theory, are as follows:

1. Primarily the formation of hemorrhoids is dependent upon the existence of a structural weakness in the walls of the veins. This weakness may be hereditary or acquired.

2. Acquired weakness is caused by a loss of tone of the muscle fibers in the venous wall and in the levator ani, due to failure of hormonal competence.

3. The wall of the hemorrhoidal vein, weakened by lack or loss of normal tonicity, readily responds to any increase of pressure within the hemorrhoidal area. It responds by elongation, dilation and thinning. This causes the clinical sign of tumor or swelling.

4. Increased size of the vein makes it tortuous and large, causing it to protrude into the rectal lumen, where it is subject to additional trauma. This gives rise to another clinical sign, the sense of rectal fullness or weight.

5. The levator ani muscles cease protecting the area from intra-abdominal pressure, become less effcient in defecation and tend to permit prolapse of the hemorrhoids. The clinical sign of this is tenesmus.

6. Trauma results from the pressure of large fecal masses, abrasion by hard fecal masses or the laceration of enema tips or dilators. Clinically noted in consequence of this are the symptoms of soreness, pain and/or itching.

7. Infection, in the form of thrombo-

phlebitis of the hemorrhoidal veins, follows. Pain is apt to be the prominent clinical symptom, although, when rupture of the vein and thrombosis occurs, a characteristic swelling over the course of the vein is an added clinical sign.

This to my mind is the end result of the process that begins primarily in the loss of muscle tone in the wall of the vein and in the levator ani.

Relation of Aging to the Hemorrhoidal Process.—The question naturally arises as to why the smooth muscle, of which the middle coat of the vein wall is composed, should show degenerative changes. But there is nothing extraordinary in the process; surely it is rather illogical that the clinical mind, which has accepted the idea of senile arteriosclerosis so wholeheartedly, apparently has never suspected that changes may possibly occur in the venous side of the vascular tree. One would do well to realize that the underlying process of aging definitely involves the progressive deterioration of vital functions. Nowadays aging has come to be regarded as an important medical problem; vascular diseases are predominantly the problem within that problem, and the tissue comprising the walls of the veins is just as much affected by the progressive alteration of vital function as are the arteries.

Statistics will show that the greatest incidence of hemorrhoids is in the fourth and fifth decades of life, when stress and strain are most severe and muscular tone normally diminishes. It is at this time that the first indications of oncoming senility appear. Is it not logical to assume that there may possibly be a relation between the two conditions? Certainly it is known that loss of muscle tone due to failing gonadal secretion is a definite indication of the progressive changes that terminate in senility.

Still further, smooth muscle tissue throughout the body derives its innervation from the sympathetic nervous system. Certainly the muscle cells in the walls of the veins are so innervated. The hormone that controls the sympathetic nervous system, or at least exerts the greatest effect on it, is that derived from the pituitary. It is failure in quantity or quality of this hormone that determines directly or indirectly the normality or subnormality of the muscular tone of the veins.

If the foregoing statements are true of the muscular tissue scattered throughout the wall of the hemorrhoidal veins, they are equally true with regard to the muscle fibers of the levator ani. Experimental workers in the field of endocrinology have long since noticed that the levator ani is particularly sensitive to the effects of androgenic substances. As a matter of fact, for years they have used these muscles in rats for making androgenic assays. The loss of muscle tone of this important pair of muscles is, to my mind, a hitherto unrecognized fact and one that has the greatest importance in the causation of hemorrhoids. By virtue of its normal function, namely, to protect the anal and rectal structures from the pressure of the abdomen and its contained viscera, the progressive failure of that function brings to bear pressure factors which, when added to the intrinsic weakening of the veins themselves, induce hemorrhoid formation.

Given a set of blood vessels, the veins, in which the muscular tone has been lowered, the increase of intravascular pressure, *e.g.*, during the act of straining at the stool or coughing, it is easy to understand how the effect of a weakness that is *general* throughout the venous tree becomes *particular* at points where the strain is greatest and the wall is weakest.

It is, of course, a matter of common clinical observation that senility is by no means synonymous with age. It can occur prematurely, and its occurrence can to some degree be postponed. The key to the situation is definitely connected with the glands of internal secretion. Whatever affects them affects in turn the rest of the body's tissues. Chronic intoxication, faulty nutrition, anemia or mechanical interference with the gland itself all have their effect upon the gland and hence on its

secretion. Furthermore, endocrine imbalance may have quite the same effect. The one fact that remains is that smooth muscle atony is directly proportional to the diminshed secretion of the gonads, of the pars nervosa of the pituitary gland and possibly of other glands of internal secretion.

To apply these generalities to the specific instance of hemorrhoids: The condition occurs clinically with greater frequency in the later decades of life, and thus in conformity to the normal decrease in muscle tone due to the normal decrease in gonadal and pituitary hormones. When hemorrhoids occur in the earlier decades, they are, in accordance with this theory, just as much a sign of senile change as when they occur in the latter decades. Hence I here state my opinion that hemorrhoids are a geriatric problem *at any age.*

The recognition of this fact will, I am sure, call for a revision of therapy in view of the broader etiologic aspects therein implied. It can readily be seen that a mere hemorrhoidectomy does not represent full discharge of the surgeon's duty to his patient. There is much more to be done. Care should be directed along the lines of determining *why* the muscular tone of the veins is failing and *why* the pituitary gland or the gonads are losing their functions. Viewed in this light, the patient will be seen to merit a thorough general physical examination, including a survey of his endocrine competence. He also deserves treatment suited to all the pathologic observations in his case, many of which are unaffected by hemorrhoidectomy.

In my opinion, acceptance of this broader view of the cause of hemorrhoids will accomplish much good. It will benefit innumerable patients and will add to the art of proctologic practice an accessory science of proctologic problems.

It is a curious fact that the ancients referred to saccular dilatations in veins throughout the body as "piles," and old-time medical books described "piles" in the nose and in the esophagus as well as in the lower part of the colon. It would seem, therefore, that the ancients intuitively sensed the actual causes ascribed by my own theory to hemorrhoid formation. In other words, they realized the structural and causative relations common to venous varicosities throughout the body. Verily, as the French say, the more a thing changes, the more it is the same!

SUMMARY

In the light of recent research, accepted notions as to the cause of hemorrhoids can no longer be considered adequate. The muscle tone of the veins and that of the levator ani are all-important in maintaining the structural integrity of the hemorrhoidal veins. When this tone is inefficient because of a hereditary deficiency or because the tone of the muscle fibers has been decreased, the hemorrhoidal veins cannot successfully combat the extra strain pressure in the portal system, and hemorrhoids result from dilatation of the veins within that system. A hitherto unsuspected cause of decreased tonicity in these veins is to be found in the decrease of certain hormones, since these normally stimulate the sympathetic nervous system, which in turn maintains the tonicity. When, therefore, because of faulty nutrition, toxemia or functional failure of the glands of internal secretion there is a decrease in the quantity or quality of hormones, endocrine imbalance results. This is known to affect the autonomic nervous system and hence the smooth musculature of the veins. Since age incidence of hemorrhoids coincides with the periods of disordered endocrine inefficiency, it is more than likely that the endocrine factor is a very potent one in instituting the changes that eventuate in hemorrhoid formation.

RÉSUMÉ

A la lumière de récentes recherches, les notions faites quant à la cause des hémorroïdes ne peuvent plus être considérées. Pour maintenir impeccable les veines

hémorroïdales, il convient de maintenir à un certain degré la musculature anale. Quand cette dernière est insuffisante, les veines hémorroïdales ne peuvent pas combattre suffisamment la pression au moment de l'évacuation, et les hémorroïdes sont le résultats de la dilatation de ces veines. Cette déficience dans la structure des veines est souvent due à un manque d'hormone, alors que les hormones stimulent le système nerveux sympathique, qui en retour maintient la tonicité.

Certains cas, à cause du manque de nutrition, toxémie et dysfonctionnement des glandes sècrètoires internes, subissent un abaissement de la quantité et de la qualité des hormones, et une déficience endocrinienne en résulte. Cette déficience affecte la musculature des veines. Elle coincide avec l'âge, alors que des désordres endocriniens apparaissent, ce qui nous laisse conclure que les hémorroïdes se forment après ce désordre endocrinien.

ZUSAMMENFASSUNG

Die bisher gueltigen Auffassungen von der Aetiologie der Haemorrhoiden koennen einer Nachpreufung im Lichte neuerer Forschung nicht mehr Stand halten. Zur Erhaltung der unversehrten Struktur der Haemorrhoidalvenen sind der Muskeltonus der Venen und der des Levator ani von ueberragender Bedeutung. Wenn der Tonus auf Grund angeborener Schwaeche oder infolge Nachlassens des Tonus der Muskelfasern unzureichend ist, sind die Haemorrhoidalvenen einem uebermaessigen Belastungsdruck im Pfortadersystem nicht mehr voellig gewachsen, und als Folge von Venenerweiterungen im diesem System bilden sich Haemorrhoiden. Eine bisher unbeachtete Ursache fuer die Herabsetzung des Tonus in diesen Venen bildet der Mangel gewisser Hormone, die normalerweise das sympathische Nervensystem, welches seinerseits en Tonus erhaelt, stimulieren. Wenn infolge falscher Ernaehrung, Toxaemie oder funktionellen Versagens der innersekretorischen Druesen eine Verminderung der Menge oder der Qualitaet von Hormonen eintritt, entsteht eine Stoerung des innersekretorischen Gleichgewichts. Eine solche Stoerung kann bekanntlich das autonomische Nervensystem und auf diesem Wege die glatte Muskulatur der Venen beeinflussen. Da die Haemorrhoiden in einem Lebensalter auftreten, in dem im allgemeinen auch Stoerungen und Insuffizienzen der innersekretorischen Druesen entstehen, ist es mehr als wahrscheinlich, dass der endokrine Faktor in der Entwicklung der z u r Haemorrhoidenbildung fuehrenden Veraenderungen eine sehr erhebliche Rolle spielt.

RESUMEN

No pueden aceptarse ya como adecuadas, a la luz de investigación reciente, las nociones etiológicas aceptadas sobre las hemorroides. Son importantes para el mantenimiento de la integridad estructural de las venas hemorroidarias el tono muscular venoso y el del elevador del ano. Cuando este tono es ineficaz por deficiencia hereditaria o porque el tono de las fibras musculares haya disminuído, las venas hemorroidarias no pueden resistir satisfactoriamente la presión extra del sistema porta, resultando de ello la dilatación de las venas dentro de dicho sistema. A este respecto, una causa insospechada de la tonicidad disminuída de dichas venas se atribuye a la disminución de ciertas hormonas, dado que estas estimulan normalmente el sistema nervioso simpático, que a su vez mantiene la tonicidad. Cuando debido a nutrición defectuosa, toxemia o deficiencia funcional endocrina ocurre una disminución en la cantidad o calidad hormonal se produce desequilibrio endocrino, que afecta al sistema nervioso autónomo y por ende a la musculatura venosa. Dado que la edad de incidencia de las hemorroides coincide con los períodos de ineficicia endocrina, es muy probable que el factor endocrino intervenga en forma muy importante para la formación hemorroidaria.

RIASSUNTO

Alla luce delle recenti ricerche non è più possibile accettare come sufficienti le nozioni classiche sulla causa delle emorroidi. Il tono muscolare delle vene e quello dell'elevatore del'ano sono moto importanti per mantenere l'integrità strutturale delle vene emorroidarie. Quando tale tono sia insufficiente per cause ereditarie o per diminuzione del tono muscolare, le vene emorroidarie si trovano a non poter sopportare gli eccessi de pressione nel sistema portale e le emorroidi sono il risultato della dilatazione delle vene in queste vene è da ricercarsi nella scarsita di insospettata di diminuzione del tono di queste vene è ricercarsi nella scarsità di alcuni ormoni che normalmente stimolano il sistema nervoso simpatico, il quale a sua volta sostiene il tono. Ne segue che quando per insufficiente nutrimento, tossiemia o deficit funzionale delle ghiandole a secrezione interna si verifica una diminuzione nella quantità o qualità degli ormoni, ne risulta uno equilibrio ormonico. Questo è una causa riconosciuta di compromissione del sistema venoso autonomo e per conseguenza della muscolatura liscia delle vene. Poichè l'epoca di comparsa delle emorroidi coincide con il periodo dei disordini endocrini, è più che probabile che un fattore endocrino sia della maggior importanza nel determinare le modificazioni che conducono alla formazione di emorroidi.

SUMARIO

A luz de recentes pesquizas as noças aceitas como causa de hemorroidas não devem ser tidas como adequadas. O tonus muscular das veias e aquele do elevador do anus é de toda importancia para manter a integridade estrutural das veias hemorroidarias. Quando este tonus é ineficiente devido a deficiencia hereditaria, ou porque o tonus das fibras musculares tenha descrescido, as veias hemorroidarias não podem combater a pressão sobresalente no sistema porta e as hemorroides resultam da dilatação agora insuspeita de tonicadade diminuida nestas veias é para ser encontrada na diminuição de certos hormonios, desde que eles normalmente estimulam o sistema nervoso simpatico, o qual a seu turno mantem a tonicidade. Quando, portanto, devido a pobre nutrição, observam-se toxemia ou insuficiencia funcional das glandulos de secreção interna, uma diminuição na quantidade e qualidade dos hormonios resulta. E sabido que isso afeta o sistema nervoso autonomo e cinsequentemente a musculatura lisa das veias. Desde que a idade de incidencia das hemorroidas coincide com os periodos de insuficiencia endocrinica desordenada é acreditavel que o fator endocrinico é muito potente em instituir as mudanças que resultam na formação de hemorroidas.

To Our Contributors Abroad

We regret to announce that under current publishing conditions it has become impossible for the *Journal* to arrange the translation into English of original articles submitted in other languages. With the single exception of articles written specifically for the *Seccion en Espanol,* which, of course, do not require translation, we must therefore request that all articles henceforward be submitted in the English language. Prompt publication can be greatly facilitated if all manuscripts are typed in double or triple space to allow room for editorial corrections. Your cooperation will be deeply appreciated.

Editorial

Speaking of Horizons

Mr. Harold Ridley of London, a prominent contributor to this issue of the *Journal,* is a modest man. His paper, *Further Observations on Intraocular Lenses in the Surgical Treatment of Cataract,* announces for the first time in an American publication one of the most remarkable achievements in the history of ophthalmic surgery—the successful substitution of acrylic lenses for the extracted lenses of patients with cataract. A true Briton as well as a true scientist, he makes this announcement in the same tone of voice, so to speak, that he might use in remarking on the weather. The fact remains that he has revolutionized the surgical treatment of cataract, which has changed but little in the past several centuries. For natural lenses clouded by cataract, heavy spectacles have always been required. Mr. Ridley's new technic, which replaces the human lens with a plastic disc of identical refractive power, makes it unnecessary for the patient to wear glasses at all.

It was no easy task. Prolonged and patient effort and many trials accompanied the search for the right plastic; still greater difficulties presented themselves in finding volunteer patients to submit to the treatment. The brilliance of the idea and the benefits of the treatment, if successful, were obvious; but would it be successful? Nobody knew. Mr. Ridley himself did not know.

Perseverance, however, brought success as usual, and volunteers were found. The results in the first case were good, in the second case better and in the third case well-nigh perfect.

The story of the manner in which Mr. Ridley came by his idea is highly revealing as to his character. After a surgical demonstration a student pointed out to him, facetiously, that although he had extracted a lens successfully he had neglected to put it back. Far from taking umbrage at this brash criticism, Mr. Ridley took thought instead, and Mr. Ridley's imagination took fire. In the last analysis it is man's imagination that has lifted him to a level above all other animals, propelled him irresistibly to ever higher and higher ground, and produced what we know as civilization. All science, all art and all philosophy are its offspring. The benefactors and saviors of human society are those who capture this power and put it to work, who look beyond the homestead to the horizon, who are able to recognize the reality of things already existent but not yet visible to man's limited sight. Among physicians and surgeons, who are charged with man's physical welfare and the preservation of his life and faculties, it is men of this kind who make history. It is men who have constantly in their ears the call so aptly expressed by Mr. Ridley's countryman. Rudyard Kipling:

> *Something's missing. Go and find it.*
> *Something's lost behind the ranges.*
> *Something's there behind the ranges,*
> *Lost and waiting for you. Go!*

and who are not afraid of the ranges and what may lie behind them, who blaze new trails toward truth.

Not all of us are equally endowed with imagination, but each of us has a share. If all of us used it to such good effect, the slow and painful process of evolution would be accelerated to an incredible degree. All honor to Harold Ridley, who has given us this latest heartening example of what may and often does lie beyond the ranges. May the clearer vision he has given his patients be reflected in a clearer vision, throughout the medical profession, of the unlimited, unexplored horizons that still lie beyond us. —P. C.

A Glance at the Future*

"Science has no country because knowledge is the inheritance of humanity, the torch which lights the world."—Pasteur.

Early this month several Dallas doctors were in Chicago for the Seventeenth Annual Assembly of the United States and Canadian Sections of the International College of Surgeons. The program concluded with the convocation ceremonies, when, with pomp and pageantry, Fellowship in the College was conferred upon men from thirty-two nations of the world.

As one watched the procession of the flags and saw distinguished scientists from over the world presented on the stage, one could not help remembering the book "One World," written by the late Wendell Willkie.

Many will recall his trip around the globe and his vision of "one world" brought closer by modern transportation and communication. It has been said often that we must learn to live together, as nations, or face total destruction.

Business and commerce have long ago found their way into all the byways of the world, and have even cut out new ones, sometimes through jungles and across mountains. Too often the desire for selfish gain has brought enmity rather than friendship, war rather than peace.

For centuries, representatives of religion have followed the trails of commerce into all lands, and sometimes have blazed new trails, taking a message of good will and brotherhood. The results have been encouraging but slow, as measured by man's standard of time.

Who can say but that the science of medicine has a part in this panorama, even a responsibility? The relief of pain and suffering, the conquering of disease, the realization of an abundant, healthy life is just as important in Thailand and Iraq as it is in Kalamazoo, Michigan, or Dallas, Texas.

Dr. Burton E. Park, M.D., F.A.C.S., F.I.C.S.

This nation is now in a position of leadership in the science of medicine. It is obvious that here is a great challenge to join forces with Religion and Commerce and help bring about this "one world" of brotherhood and peace.

Maybe that's what is taking place and we don't fully recognize it.

—Barton E. Park, M.D.

Reprinted by courtesy of Dr. Park and the Dallas Medical News, Dallas, Texas.

Section News

International College of Surgeons

United States and Canadian Sections

Karl A. Meyer, M.D., F.A.C.S., F.I.C.S., Secretary

Brazilian Section Announces Meeting: The Brazilian Section of the International College of Surgeons announces that its Second Sectional Meeting and the First Panamerican Assembly of the Brazilian Section will be held from October 5 to 9, 1953, under the auspices of the Government of the State of Parana on the occasion of the First Centenary of the foundation of the State of Parana. Three official themes will be discussed, as follows: Surgery of the Biliary Passages; Apparent Death under Anesthesia; and Indications and Counter-Indications for Opening the Chest Cavity. Other subjects of general interest will also be presented.

Participating in the meeting will be surgeons from the United States, Argentina, Bolivia, Canada, Colombia, Costa Rica, Haiti, Honduras, Mexico, Nicaragua, Peru, Venezuela, Paraguay, Chile, Uruguay, and Brazil. The main sessions will be held in Curitiba.

For further information address the Secretariat to the Brazilian Section, Rua Cesareo Motta 112, Predio Conde de Lara, Sao Paulo, or the International Secretariat in Chicago, 1516 Lake Shore Drive.

Philadelphia Regional Meeting Program Announced: On February 13 and 14 are the regional meeting of the United States Section of the International College of Surgeons will be held in Philadelphia, with headquarters at the Bellevue Stratford. Dr. W. Wayne Babcock is honorary chairman, Dr. Moses Behrend is chairman, and Dr. Albert Behrend is co-chairman of the meeting. Dr. Babcock will preside at the opening session, which will begin at 9 a.m. on February 13 with motion pictures and continue with the following discussions and events:

Medical Management of Occlusive Arterial Lesions
A. Wilbur Duryee, M.D., New York City

Physiology and Pathology of Occlusive Arterial Disease
William T. Foley, M.D., New York City

Surgical Management of Occlusive Arterial Lesions
Gerald H. Pratt, M.D., F.A.C.S., F.I.C.S., New York City

ACTH and Cortisone in Surgery
Laurence H. Kyle, M.D., Washington, D.C.

Modern Drug Therapy and Its Relation to Surgery of Tuberculosis
James D. Murphy, M.D., F.A.C.S., Oteen, North Carolina

Silent Lesions of the Abdomen
Charles S. White, M.D., Sc.D. (Hon.), F.A.C.S., F.I.C.S., Washington, D. C.

The Use of Proteolytic Enzymes in War Wounds
Col. August W. Spittler, M.D., F.A.C.S., Washington, D. C., and Capt. Robert E. Parmenter, M. C., Washington, D. C.

Luncheon—Guest Speaker—*The Hon. Joseph S. Clark, Mayor of Philadelphia*

Panel Discussion: Hypersplenism—Its Surgical Implications
Moderator: *Leandro Tocantins, M.D., Philadelphia*
Secretary: *Clyde R. Flory, M.D., F.I.C.S., Sellersville, Pennsylvania*
Collaborator: *William Dameshek, M.D., F.A.C.P., Boston*

Some Research and Studies in Pancreatic Disease
Robert Coffey, M.D., F.A.C.S., Washington, D.C.

Treatment of Atresia of the Esophagus by the Transthoracic Approach
C. Everett Koop, M.D., Philadelphia, and William B. Kiesewetter, M.D., Philadelphia

Translumbar Arteriography
Arthur Evans, M.D., Cincinnati

Banquet, Saturday, February 14
Joseph S. Lawrence, M.D., Director, Washington, D. C., office, American Medical Association

Medical Motion Picture—Splenectomy for Hypersplenism
C. Stuart Welch, M.D., F.A.C.S., Boston

Panel Discussion—Thoracic Surgery
Moderator: *Albert Behrend, M.D., F.A.*

C.S., F.I.C.S., Philadelphia; Associate Professor of Surgery, Temple University School of Medicine; Instructor, the Medico-Chirurgical College of Medicine, University of Pennsylvania.

Secretary: *George L. Armitage, M.D., F.A.C.S., F.I.C.S., Chester, Pennsylvania*

The Plastic Esophagus

Edgar Berman, M.D., F.A.C.S., Baltimore

Multivalvular Heart Disease and Concomitant Surgery

Charles P. Bailey, M.D., F.A.C.S., F.I.C.S., and *Houck E. Bolton, M.D., Philadelphia*

Cystic Diseases of the Lungs

Francis M. Woods, M.D., Boston, and *Richard Overholt, M.D., F.A.C.S., Brookline, Massachusetts*

Coarctation of the Aorta

Charles L. Sacks, M.D., Philadelphia

Safeguards in Gallbladder Surgery

Max Thorek, M.D., F.I.C.S., Chicago

Operative Cholangiography

Albert Behrend, M.D., F.A.C.S., F.I.C.S., Philadelphia

Intrathoracic Goiter

Arnold S. Jackson, M.D., F.A.C.S., F.I.C.S., Madison, Wisconsin

Luncheon and Round Table Discussion

Guest Speaker: *Honorable Horace Stern, Chief Justice, Supreme Court of Pennsylvania.*

Panel Discussion—*Anesthesiology*

Moderator: *Henry S. Ruth, M.D., F.I.C.S., Philadelphia*

Secretary: *Desiderio A. Roman, M.D., F.A.C.S., F.I.C.S., Philadelphia*

Application of Spinal Technics

Ralph M. Tovell, M.D., Hartford

Inhalation Anesthetic Agents and Techniques

Grant H. Stone, M.D., Philadelphia

The Use of Muscular Relaxants (Curare and related drugs)

Robert L. Patterson, M.D., Pittsburgh

Other Agents, Methods, Combinations and General Considerations

Mario V. Troncelliti, M.D., Philadelphia

Panel Discussion—Colon

Moderator: *Harry E. Bacon, M.D., F.A.C.S., F.I.C.S., Philadelphia*

Secretary: *Jerry Zaslow, M.D., F.A.C.S., F.I.C.S., Philadelphia*

Experiences and Follow-up in Abdominopelvic Node Dissection for Cancer of the Distal Sigmoid and Rectum

Michael R. Deddish, M.D., F.A.C.S., New York

Interesting Phases in Surgery of the Large Bowel

W. Wayne Babcock, M.D., F.A.C.S., F.I.C.S., Philadelphia

End Results and Complications in the Treatment of Chronic Ulcerative Colitis

Martin S. Klackner, M.D., F.A.C.S., F.I.C.S., Allentown, Pennsylvania

In addition to the preceding general program, there will be an Orthopedic Session on the morning of February 13, an Ear, Nose and Throat session on the afternoon of February 13, a Genitourinary Surgery session on the morning of February 14, and an Obstetrics and Gynecology session on the afternoon of February 14. The programs follow:

Orthopedic—9:20-11:00 a.m., February 13

Bone and Joint Changes following Injury, Traumatic Arthritis — Sudek's Syndrome—Weir Mitchell Causalgia

Harvey E. Billig, Jr., M.D., F.I.C.S., Los Angeles

The Surgical Treatment of Skeletal Metastatic Lesions

Irvin Stein, M.D., F.A.C.S., F.I.C.S., Philadelphia

Recent Advances in Bone Physiology

Z. B. Fridenberg, M.D., Philadelphia

Results of Traction-Transfixion of Comminuted Colles Fractures

Edwin O. Geckeler, M.D., F.A.C.S., Philadelphia

Lower Cervical Syndrome

A. M. Rechtman, M.D., F.A.C.S., Philadelphia

Eye, Ear, Nose and Throat—2 to 5 p.m. February 13

The Sphenoid Sinus from a Surgical Standpoint

George L. Whelan, M.D., Philadelphia

Present Status of the Tonsils and Adenoids in Poliomyelitis Infection.

Merrill B. Hayes, M.D., F.I.C.S., Chester, Pennsylvania

Surgical Rhinoplastic Problems

Louis J. Feit, M.D., F.A.C.S., F.I.C.S., Brooklyn

Problems of the Otolaryngologist in Neck Surgery

Joseph G. Gilbert, M.D., F.A.C.S., F.I.C.S., Brooklyn

Symposium on Deafness

Bernard L. Ronis, M.D., F.A.C.S., F.I.C.S., Philadelphia

Edward H. Campbell, M.D., F.I.C.S., Philadelphia

David Myers, M.D., F.A.C.S., F.I.C.S., Philadelphia
A. Spencer Kaufman, M.D., F.A.C.S., Philadelphia
Capt. Fred Harbert, M.C., U.S.N., F.A.C.S., F.I.C.S., Philadelphia

Genitourinary Surgery—9:20-12 Noon, February 14

Perirenal Air Insufflation
J. Sydney Ritter, M.D., F.A.C.S., New York

Penography — Perivesical and Periprostate Phlebography Through Injection of the Dorsal Vein of the Penis
Benjamin S. Abeshouse, M.D., Baltimore

Management of the Cord Bladder in the Paraplegics
Lt. Colonel Robert B. Rowe, M.C., Phoenixville, Pennsylvania

New Concepts in the Treatment of Genito-Urinary Tuberculosis
John Kingsley Lattimer, M.D., F.A.C.S., New York

The Surgical Management of Vesical Tumors
Victor F. Marshall, M.D., F.A.C.S., F.I.C.S., New York

The Surgical Management of Renal Tumors
Elmer Hess, M.D., F.A.C.S., F.I.C.S., Erie, Pennsylvania

Obstetrics and Gynecology—2 to 5 p.m. February 14

Carcinoma of the Cervix
Augustus F. Daro, M.D., F.I.C.S., Chicago

A Simple Operation for Repair of Vesico-Vaginal Fistulae following Abdominal Hysterectomy
H. C. Falk, M.D., F.A.C.S., New York

Carcinoma in Situ: What is the Practical Therapy?
Gilbert Franklin Douglas, M.D., F.A.C.S., F.I.C.S., Birmingham

Management of The Chronically Diseased Cervix
Thaddeus L. Montgomery, M.D., F.A.C.S., Philadelphia

Vulvectomy with Some Improvements in Technique
A. Herbert Marbach, M.D., F.A.C.S., F.I.C.S., Philadelphia
Louis H. Schinfeld, M.D., Philadelphia

Tri-State Assembly To Be Held in Dallas: February 5, 6 and 7 are the dates of the Tri-State Assembly to be held in Dallas, Texas, with headquarters at the Adolphus Hotel. The program, as announced by Dr. Curtice Rosser, Regent for the Texas Surgical Division of the United States Section of the International College of Surgeons, will begin at 1:30 p.m. on Thursday, February 5, at Baylor Hospital, where operative clinics covering general surgery, plastic surgery, urology, proctology, neurosurgery and gynecology will be held. Registration will be at 8:00 a.m. Friday at the hotel. A registration fee of $5.00 will be charged except for interns and residents.

Four general assemblies are planned for Friday and Saturday. On Friday a Round Table Luncheon is scheduled at 12:30, a social hour at 6:00 p.m., and a dinner at 7:30 p.m. The luncheon on Saturday will be in honor of Dr. Max Thorek, who will discuss "The International College of Surgeons."

Among the subjects included in the scientific program are those here listed:

Surgical Treatment of Increased Intracranial Pressure.
Dr. J. Grafton Love, Rochester, Minnesota.

Cancer of the Colon.
Dr. Claude J. Hunt, Kansas City.

Prevention and Management of Acute Renal Failure as a Complication of the Surgical Patient.
Dr. Arthur Grollman, Dallas.

Cardiac Arrest and Impending Death under Anesthesia.
Dr. Max Thorek, Chicago.

Symposium on Cancer of the Head and Neck.
Dr. Neal Owens, New Orleans, and Dr. C. L. Martin, Dallas.

Problems in Gastric Surgery.
Dr. Ralph R. Coffey, Kansas City.

Management of Lesions that Simulate Appendicitis.
Dr. Weldon W. Stephens, Galveston.

Proctoscopic Surgery in Pediatrics.
Dr. John G. Matt, Tulsa.

Intravenous Pyelography — an Aid in the Diagnosis of the Acute Abdomen.
Dr. Michael K. O'Heeron, Houston.

Panel Discussion on Surgical Diseases of the Anus, Rectum and Colon.
Dr. Fred B. Campbell, Kansas City, Moderator; Dr. Herbert Hayes, Houston; Dr. Paul Vickers, Oklahoma City, and Dr. George H. Thiele, Kansas City, participants.

Problems in Anesthesia.
Dr. Earl Wier, Dallas.

Additional information concerning the program may be obtained by addressing Dr. Curtice Rosser, 710 Medical Arts Building, Dallas.

Scientific Session held by New York State Surgical Division: A well attended and interesting meeting was held on November 6 at the Waldorf-Astoria Hotel in New York

City by the New York State Surgical Division with Dr. Henry M. Scheer presiding. The following subjects were discussed: "New Concept of Esophageal Surgery" by Dr. Philip Thorek of Chicago; "Problems of Low Back Pains" by Dr. A. Della Pietra of Hartford, Connecticut; "Asphyxial Emergencies" by Dr. Paluel J. Flagg of New York; "Management of Carcinoma of the Somatic Tissues" by Dr. George Pack of New York; and "Management of the Wounded of the Korean Conflict" by Brigadier General Wilford F. Hall of the United States Air Force. In the evening a dinner was tendered in honor of the Founder of the International College of Surgeons, Dr. Max Thorek.

New Jersey Section Member Honored: Honorary Fellowship in the National Gastroenterological Association was conferred upon Dr. Hyman I. Goldstein of Camden, New Jersey, at the 20th anniversary meeting and 17th annual convention of the Association, held at the Hotel Statler, New York. Dr. Goldstein is medical historian and a life member of the editorial conucil of this association, of which he has been a fellow since its founding in 1932. Dr. Goldstein was also unanimously elected an Honorary Fellow of the New Jersey Gastroenterological Society, of which he served as President in 1940-41. He helped to found this society in 1931 and is its life-time medical historian.

Dr. Goldstein, who celebrated his sixty-fifth birthday anniversary on November 2, served in 1939 as president of the Northern Medical Association of Philadelphia. He was previously elected a member of the Belgian, the Italian, and the Mexican Societies of Gastroenterology and of the Apulco (Mexico) Medical Society. He is a foreign corresponding member of the National French Society of Gastroenterology at Paris and of the Cuban Society of Cancerology, Havana.

On October 9, Dr. Goldstein addressed the West Side Clinical Society, University Club, New York, on "Errors of Priority Credit in Medicine—Forgotten Names."

Pennsylvania Division: Dr. Paul C. Craig of the Pennsylvania Division presided at the opening session of the Second Annual Eye Institute which was held at the Berkshire Hotel in Reading on Wednesday, November 12. The Institute was sponsored by the Berks County Association for the Blind, Ind., of which Dr. Craig is Medical Director.

Swiss Surgeon Honored: Prof. Dr. Albert Jentzer, F.I.C.S., Geneva, Switzerland, has been made an Honorary Member of the Surgical Society of Switzerland and a Corresponding Member of the Academy of Medicine of France. In the Surgical Division of the Academy, Prof. Jentzer is the only Swiss surgeon to have been so honored.

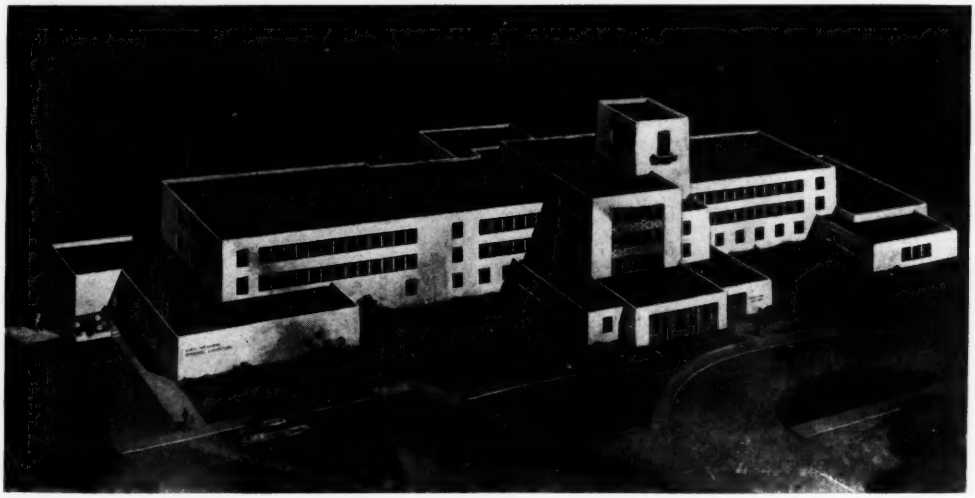
Our Newly Elected Officers

WILLIAM RANDOLPH LOVELACE, M.D., D.A.B.S., F.I.C.S.

PRESIDENT, UNITED STATES SECTION, INTERNATIONAL COLLEGE OF SURGEONS

DR. William Randolph Lovelace was born in Belle, Missouri, in 1893 and received his M.D. degree from St. Louis University in 1905. He is a member of the Board of Trustees of the International College of Surgeons and President of the United States Section of the International College of Surgeons, 1952-1953. In addition, he is a member of the American Medical Association, the American Medical Authors' Association and Phi Beta Pi. He is a Founder Member of the Southwestern Surgical Association and was a member of its Board of Regents from 1931 to 1937. From 1935 to 1937 he was President of the Board of Regents of the University of New Mexico. He is a member of the Bernalillo County Medical Society. He is a member of the Founders Group of the American Board of Surgery (1938) and of the International College of Surgeons. He founded the Lovelace Clinic and is President of its Board of Governors, as well as a member of the Board of Trustees of the Lovelace Foundation for Medical Education and Research. Dr. Lovelace did postgraduate work in Surgical Clinics in Europe in 1929, 1938 and 1949. He is Consulting Surgeon of the Veterans Administration Hospital in Albuquerque; a member of the active staff of the Bataan Memorial Methodist Hospital; a member of the Surgical Staff of St. Joseph Hospital and Sanatorium, and a member of the Visiting Staff of the Southwestern Presbyterian Hospital and Sanatorium.

Dr. Lovelace began practicing medicine and surgery in Fort Sumner, New Mexico,



Baird Memorial Research Laboratory and Lovelace Clinic.

in 1906 and settled in Albuquerque in September 1913. Joined in 1922 by Dr. Edgar T. Lassetter, he founded the Lovelace Clinic through association with physicians and surgeons. The object of the clinic was to bring the combined skills and experiences of a group of doctors to bear on the individual case for maximum assurance that treatment would be adequate. Its history bears witness to the need it filled and the integrity and effectiveness of its management.

An important additional enterprise, the Lovelace Foundation for Medical Education and Research, was established on Oct. 1, 1947. It is a philanthropic foundation for the advancement of medical science.

Shortly after the establishment of the foundation a building program was started, and in September 1950 the building was completed and occupied. At the time the foundation was created it marked the end of private ownership of the Lovelace Clinic, which was founded twenty-five years earlier by Dr. Lovelace, with his brother-in-law, Dr. Edgar T. Lassetter. The setting up of the foundation meant that the title, equipment, clinical records, library, and good will of the clinic were transferred to the foundation by an irrevocable agreement.

The articles of organization were filed in the state capital at Santa Fe, New Mexico. The former owners stipulated that the clinic's high level of medical services should be maintained and the foundation conducted "in the broadest and most liberal manner as an educational, research, scientific, and charitable organization not for profit".

The Lovelace Foundation does not engage in the practice of medicine; this is the function of its sponsor the Lovelace Clinic, Allied Hospital and Medical Services, and the medical profession in general.

The Board of Trustees, as provided in the certificate of incorporation, has full power to conduct the foundation in accordance with its objectives, to determine policies, establish programs, and administer the assets and income. The board has fourteen members, elected for periods up to ten years, who serve without remuneration.

The Board of Governors of the Lovelace Clinic as provided by the articles of association determines the policies of the Lovelace Clinic and directs its affairs. Its members serve in this capacity without compensation. There must be doctors of medicine and graduates of reputable medical schools; five years' experience in medical practice or postgraduate training is required, and all must be associate members of the clinic. Each holds office for so long as he is an associate, his successor being elected by the remaining members of the Board of Governors.

Dr. Lovelace's record, both as a surgeon and as a member of the College, is one of self-forgetful service and unstinted devotion. He has never allowed any handicap, even ill health, to prevent the carrying out of duties once accepted. All Presidents of the United States Section in the history of the College have been men of high integrity and outstanding ability; if they were honored by the office they filled so ably, they honored the office equally by the manner in which they discharged its heavy responsibilities. Dr. Lovelace has accepted his new dignity with characteristic modesty, but those who know him and are acquainted with his work are well aware that he merits the honor paid him and that no worthier successor to our late and well-beloved colleague, Herbert Acuff, could well be found.

ARNOLD S. JACKSON, M.D., F.A.C.S., F.I.C.S.

PRESIDENT-ELECT, UNITED STATES SECTION

Dr. Arnold Stevens Jackson was born in Madison, Wisconsin, in 1893. At the University of Wisconsin he received his B.A. degree in 1916 and his B.S. degree in 1917. His medical training was pursued at the College of Physicians and Surgeons of Columbia University in New York, from which he was graduated as Doctor of Medicine in 1919. A fellowship at the Mayo Clinic occupied him from 1919 to 1922, and in the latter year he was granted the degree Master in Surgery at the University of Minnesota. His internship was served at the Madison General Hospital of Madison, Wisconsin, and in St. Luke's Hospital, New York City. Residencies at the Mayo Clinic and at St. Mary's Hospital, Madison, Wisconsin, followed.

Dr. Jackson is a Fellow of the American College of Surgeons; a Past Vice-President of the Western Surgical Association; former Secretary and now President-Elect of the International College of Surgeons; Past-President of the American Goiter Association; Past-President of the Wisconsin Surgical Society; member of the Founders Group of the American Board of Surgery, Mayo Clinic Alumni Association, American Medical Association, Wisconsin Surgical Travel Club, Dane County Medical Society and the American Association of Railways Surgeons.

The special field of surgery in which Dr. Jackson has interested himself is surgery of the thyroid, in which he has an enviable reputation both as an operating surgeon and as an authority on the subject of goiter. He is the author of many articles and other publications in this field. As Chief Staff of the Jackson Clinic in Madison, Wisconsin, and Editor of the Jackson Clinic Bulletin, he has done outstanding work. These duties follow directly in the line of Dr. Jackson's family tradition, for the Clinic was founded in 1917 by his maternal grandfather Dr. Joseph Hobbins, his father, Dr. James A. Jackson, and his father's two brothers Reginald and James Jackson, both surgeons who had served in the Civil War. The Clinic has grown rapidly and now has a full staff in every department. It is associated with the Methodist Hospital of Madison.

Dr. Jackson's valuable editorial services as Section News Editor for the Journal of the International College of Surgeons, carried on simultaneously with a heavy schedule of duties as Secretary of the United States Section, are well known to all members of the College and warmly appreciated by the Editor. Now, as President-Elect and prospective successor to Dr. Lovelace, he has been relieved of these duties by Dr. Karl Meyer of Chicago.

Among Dr. Jackson's many talents and qualifications for organizational leadership are his great interest in human affairs, his genial personality and his knowledge of the organizational field. His record in the College is unexceptionable, making his eventual election to high office a matter of course. His many friends, within and without the College, congratulate him and reaffirm their faith that any interest of the College that comes under his control will be and remain in safe hands.

IX° Congresso
Colégio Internacional de Cirurgiões

Aviso Aos Membros do Colégio

A Comissão organizadora do IX Congresso do C.I.C. a realizar-se em São Paulo, Brasil, em 1954, por meio dêste faz saber a todos os interessados que é inteiramente inconveniente antecipar a data de 26 de abril-2 de maio, 1954, marcada para a sua realização, para a de fevereiro ou março de 1954, conforme solicitação de vários elementos do grupo norte-americano.

O IX Congresso do C.I.C. está sendo planejado para ser uma das mais briliantes comemorações culturais do grupo dos festejos do IV Centenário de São Paulo, devendo atrair à capital do Estado de São Paulo cerca de 2.500 Congressistas.

O Governo de São Paulo, empenhado em que os festejos do IV Centenário constituam oportunidade para que nossos ilustres visitantes fiquem confortavelmente instalados, e possam ter a mais agradável permanencia em nossa capital, está estimulando a construção de 3 novos hotéis, que serão inaugurados justamente em abril de 1954.

Assim, pois, em fevereiro ou março, 1954, a situaçao para hospedagem em São Paulo para um grande grupo de Congressistas, é identica à atual, isto é, difícil e deficiente, sendo necessário espalhar os Congressistas em muitos pequenos hotéis, e sendo maior o grupo, alguns necessitando instalar-se em hotéis que não possuem condições mínimas de conforto.

Por outro lado, o Governo de São Paulo está providenciando para o ano de 1954 grandes empreendimentos, que tornarão o turismo ao nosso Estado muito mais agradável; assim, a segunda pista da aoto-estrada São Paulo-Santos, que abreviará a viagem, tornando o passeio mais seguro e agradável.

Assim também, a instalação de uma Feira Internacional de A mostras, no Parque Ibirapuera, que permitirá aos visitantes apreciar o desenvolvimento da indústria de todas as partes do mundo.

Assim também o governo de São Paulo está fazendo apressar as obras da cidade Universitária, em Butantã, e outras obras grandiosas, nas quais vários

grande s salões de conferencias serão feitos, para permitir lugares adequados à reuniões de grandes Assembléas.

Finalmente, a Comissão organizadora do IX Congresso do Colégio Internacional de Cirurgiões, desejando dar aos visitante uma oportunidade excepcional para verem floridas numerosas espécies brasileiras, entrou en entendimentos com sociedades de colecionadores de orquídeas, como o Círculo Paulista de Orquidófilos, para que eles desde já preparem suas plantas para florirem justamente em Abril, 1954.

A Comissão organizadora do IX Congresso, lastimando não poder atender ao pedido do simático grupo de congressistas norte-americanos, pelos motivos acima expostos, espera ter o prazer de recebê-los em São Paulo, cordialmente, em abril de 1954, desejando desde já que tenham os mesmos no Brasil uma estadia agradável, ao mesmo tempo que realizando um Congresso social e científico digno das credenciais do C.I.C.

Os temas oficiais escolhidos foram os seguintes:

1) Experiencias com a Socialização da Medicina nos diversos países.

2) Novas aquisições da Radiologia com contrastes nas várias especialidades cirurgicas): a) Neuro-Cirurgia b) Sistema cardio-vascular c) Endocrinologia d) Aparelho respiratório e) Aparelho Urinário f) Tubo digestivo g) Ortopedia h) Ginecologia.

3) Experiencia com o uso de antibioticos em todos os ramos da cirurgia: a) Neuro-Cirurgia b) Sistema cardio-vascular c) Aparelho respiratório d) Aparelho Urinário e) Tubo digestivo f) Ortopedia g) Ginecologia.

Ulteriormente, depois de esolhidos os relatores para os temas oficiais, e eleitos os convidados de honra, novos avisos serão feitos por intermédio do Journal, a todos os interessados.

Todos os que desejarem participar do IX Congresso Internacional em São Paulo, em abril de 1954, queiram com antecedencia escrever para o.

Prof. Dr. Carlos Gama.
Praça Ramos Azevedo, 209-70, andar
São Paulo, Brasil.

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New Books

Nueva Patología Functional. By Miguel López Esnaurrízar. México, D. F., Unión Tipográfica Editorial Hispano-Americana, 1951. Pp. 231. Diagrams, tables.

The functional disorders and functional components of syndromes afford a rich field for physiologic research, one that is receiving more and more attention today, not only from neurologists and psychiatrists but from internists. It is recognized that these disorders conceal some of the deepest mysteries of medicine. Their solution calls for intensive research based on an advancing knowledge of fundamentals.

At the same time, practitioners recognize that functional disorders and the functional overlay of organic disease are very frequent and urgent and consider themselves bound to become acquainted with the best empiric and symptomatic treatments available and to attempt to correlate these with their soundest knowledge of anatomy and physiology.

Dr. López Esnaurrízar has drawn together all these requisites. The therapeutic method that engages his main attention is infiltration of the sympathetic system with procaine and ethyl alcohol (splanchnotherapy). To introduce this method he has given a full scale review of the anatomic and pathologic background of functional disorders and the relation of these disorders to the sympathetic system. Further chapters describe the anatomic physiologic, physiogathologic and pathologic aspects of this system. Several chapters are then devoted to the various types of functional disorders, with emphasis on those which respond to infiltration. Infiltration of the sympathetic system is then discussed in detail, including the various sites and cautions as to technic.

Although the merits of infiltration with alcohol are well recognized, it must be admitted that pain during the procedure and the distressing sequelae, including neuritis, have often barred it as a method of choice. Thus, E'tienne-Martin, in his recent monograph on hypertension, remarked that after a patient has suffered one painful treatment, he is usually unwilling to undergo a second.

According to López Esnaurrízar, newer discoveries connected with the process of infiltration have made it possible to minimize the incidence of neuritis, and the procedure itself is usually painless if done properly. For this reason his comments on technic will command special attention. To the overloaded practitioner, we recommend turning to these first of all—perhaps directly to the chapter entitled "Dangers and Inconveniences of Blockage with Ethyl Alcohol." Other remarks on avoiding distressing sequelae are found at the end of the chapter on the general technic of infiltration.

Using this method of *visceral recuperation*, as he names it, the author has attacked a wide spectrum of functional disorders. Reporting on each in turn, he underlines the interrelations of the several systems that exert control over body functions: the central and peripheral nervous systems, the sympathetic and parasympathetic systems, the endocrine system and the psyche. The remarks on psychosomatic disorders and their relief are especially worthy of notice.

Glandular dysfunctions are another central and timely topic, involving as they do the relations of the hormonal and sympathetic systems. Here a special word is in order on the author's successes in treating rheumatoid arthritis by his method of infiltration of the sympathetic system to influence the function of the pituitary and adrenal glands. This procedure, he maintains, normalizes ACTH and cortisone production in a more physiologic manner than does direct injection of the hormones. Consequently, relief has been permanent, with no relapse on withdrawal of treatment, and without atrophy of the adrenal or the pituitary glands. He reports 68 cures of rheumatoid arthritis by this method.

A final chapter consists of abstracts and comments on some of the recent literature, with separate remarks on each article selected. In this form of discussion there is real value, both through the increased interchange of ideas, and through enrichment of the medical bibliography. It is a practice we gladly commend, and recommend to others publishing today.

There are also selective bibliographies of the recent literature, including a separate bibliography of Mexican authors.

The author, it may be added, is founder of the Mexican Academy of Surgery and Professor of Surgery in the Universidad Nacional de México. M. T.

In Memoriam

M. G. Kini
M.C.H., F.R.C.S., F.A.C.S., F.I.C.S.

M. G. KINI

M.C.H., F.R.C.S., F.A.C.S., F.I.C.S.

A sudden attack of coronary thrombosis on August 22, 1952, ended the life of Dr. M. G. Kini, President-elect, Indian Section of the International College of Surgeons. Dr. Kini was one of the eminent surgeons of India who had contributed much to the progress of surgery in his country. A founder member of the Association of Surgeons of India, he took an active interest in its annual conferences and at the time of his death was treasurer, member of its governing body, and member of its editorial board. He served as president in 1947.

Dr. Kini was superintendent of the Stanley Hospital at Madras until three years ago when he organized in Bombay the Society for Rehabilitation of Crippled Children and served as superintendent of its hospital.

Dr. Kini was a keen student of surgery, methodical in keeping case records, and had a large collection of photographs of patients, specimens, and slides. He was a member of the editorial board of the *British Journal of Surgery* and a Fellow of the American College of Surgeons and of the International College of Surgeons.

JOAQUIM A. DE BRITTO

M.D., F.I.C.S.

The Vice President of the Regional of Rio de Janeiro of the Brazilian Section of the International College of Surgeons, Dr. Joaquim A. De Britto, died on October 16, 1952.

Dr. De Britto was Assistant Professor of Surgery of the National Faculty of Medicine of the University of Brazil, Chief of the Surgical Department of Hospital Britto, surgeon of Santa Casa of Rio de Janeiro, and Chief of "Servicio Catta Preta" of the Pronto Socorro of Rio de Janeiro. He was a member of the National Academy of Medicine.

The members of the Directorate of the Brazilian Section registered a vote of deep sorrow for the decease of their associate and friend.

HOWARD JOSEPH KENNEY

M.D., F.I.C.S.

A coronary attack on July 20, 1952, ended the career of Dr. Howard Joseph Kenney of Delavan, Wisconsin, at the age of 48. Dr. Kenney received the degrees of Bachelor of Science in Medicine in 1928 and Doctor of Medicine in 1929 from Marquette University School of Medicine in Milwaukee. He served his internship and surgical residency at Milwaukee County General Hospital from February 1, 1928 to June 30, 1931, and had been a member of the active staff of Lakeland Hospital at Elkhorn, Wisconsin, since 1931. General abdominal surgery was his specialty. Dr. Kenney became a qualified Fellow of the International College of Surgeons in 1950.

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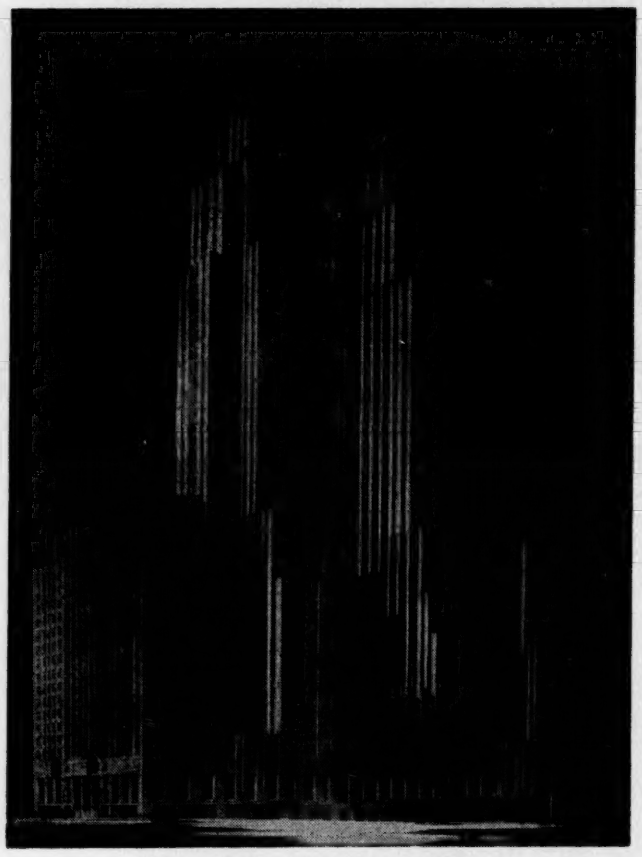

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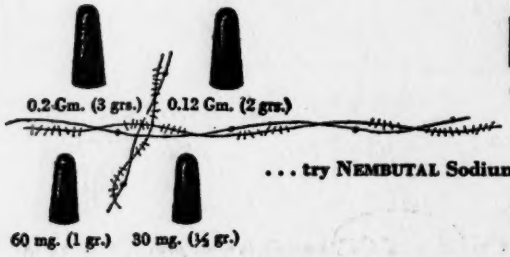

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